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FORMERLY

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NEW YORK, SATURDAY, NOVEMBER 29, 1919

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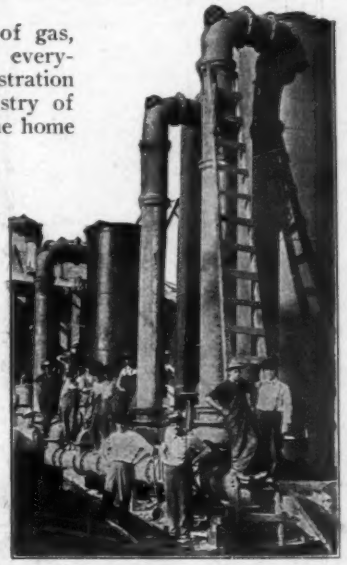
$4 Canada $5 Foreign

"An Epoch Making Influence" In the Gas Industry—

"There have appeared from time to time epoch making influences in the history of the gas industry since 1792, when Murdock introduced gas for lighting. Some have been apparent at the time, while others are appreciated only after a lapse of years during which their influence has been at work.

"The introduction of Cast Iron Pipe about 1808 for distribution purposes greatly aided in making the gas industry permanently successful. Cast iron mains seldom require renewal except because of obsolescence due to existing mains being too small for the demands of modern industry."—*W. R. Addicks, Vice-President Consolidated Gas Company of New York, in "Some Notes on Gas Standards," paper read before the New York Section Illuminating Engineering Society, November 9, 1916.*

The value of Cast Iron Pipe, both in the production and distribution of gas, has been so long and so universally recognized by gas works engineers everywhere that comment on Mr. Addicks' statement is unnecessary. The illustration at the top of this page was sent out during the war by the British Ministry of Information to show how the British women did their part in keeping "the home fires burning," and incidentally it is a splendid picture of the early type of gas plant in which Cast Iron first proved its genuine worth. The other picture shows an installation of condenser piping being made at the La Crosse, Wis., gas plant by the Western Gas Construction Company.



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Manufacturers Producing Major Part of Automobile and Aeroplane Radiators Use Gas for Every Operation Requiring Heat

How the Radiator Is Made — Specific Operations in Which Gas Plays a Part and How It Is Utilized

By CHARLES A. DRUM

Industrial Engineer, New Haven Gas Light Company, New Haven, Conn.

When our daily papers announced the landing of the NC-4 seaplane at Lisbon, and later at Plymouth, few men in the gas industry realized the all-important part that gas played in making this feat possible.

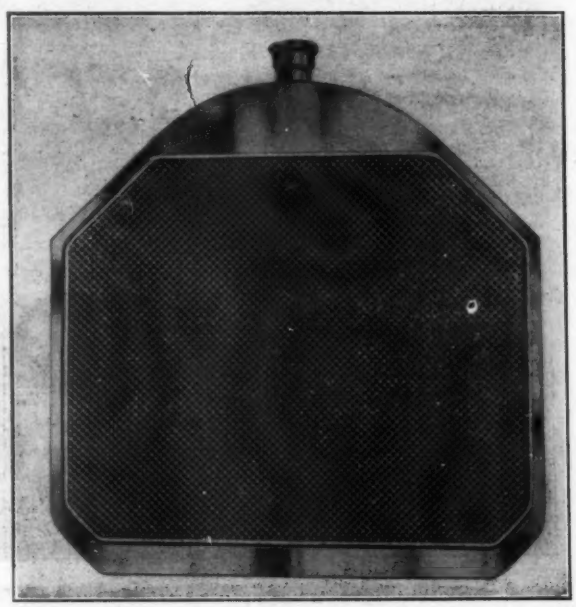
On Oct. 3, Commander A. C. Read piloted the NC-4 to a safe mooring in New Haven harbor and the following is an abstract from one of our evening papers:

> *At the Chamber of Commerce dinner, given in honor of Commander Read at the Hotel Taft yesterday, Colonel Ullman, in introducing him, made mention of the fact that the first dirigible in the United States was constructed in New Haven and much to the surprise of the builders, and of the Government, it flew. He also made known the fact that the four radiators on the NC-4 were built in New Haven by the G. & O. Manufacturing Company. In reply Commander Read said: "I wish to say that the G. & O. radiators which Colonel Ullman mentioned were selected by my engineers after rigid test, and although I was not aware that they were made in New Haven, I am glad to know it for they have stood the test wonderfully."*

From a small beginning less than five years ago the G. & O. Company has grown to be one of the largest radiator manufacturers in the country, employing over 300 skilled mechanics and occupying a five-story building with over 5,000 sq. ft. of floor space, and they have long outgrown this factory, which is devoted to the manufacture of radiators exclusively.

In order that the reader may better realize the magnitude of the radiator industry, the writer secured the following data: Over 3,000,000 lb. of sheet brass, 200,000 lb. of brass castings and 1,250,000 lb. of solder, was purchased by this company alone during 1918. Several thousand radiators of the "Tubular" type, used on the famous "Riker" and Class "B" U. S. Standard Army truck, about 2,500 of the large "De Haviland" battle plane, over 1,000 of the large patrol seaplane radiators and a large number for use on officer and pleasure cars, were manufactured in this plant during the war.

This company is now supplying radiators for the Locomobile, Sterns-Knight, Stanley Steamer, Biddle, Owen-Magnetic and a number of other high grade cars.



TUBULAR TYPE RADIATOR USED ON THE FAMOUS "RIKER" AND CLASS "B" U. S. STANDARD ARMY TRUCK

Their average production of special radiators to replace the one supplied on the famous "Ford" is somewhat over 100 per day.

Look for a brass plate near the upper hose connection on your car and you will, no doubt, find it is a G. & O., if not, then ten to one it's an English and Mersick or a Mayo (now Marlin Rockwell) radiator. These three factories supply a large majority of the radiators in use to-day on the many cars, trucks, tractors and airplanes. All three companies us gas for every operation requiring heat.

FIG. 1.—SHOWING HOW THE CRIMPED METAL IS SEALED BY DIPPING IN A FLUX AND THEN A SOLDER BATH

The Cellular Type

A brief description of the various operations in radiator manufacturing follows:

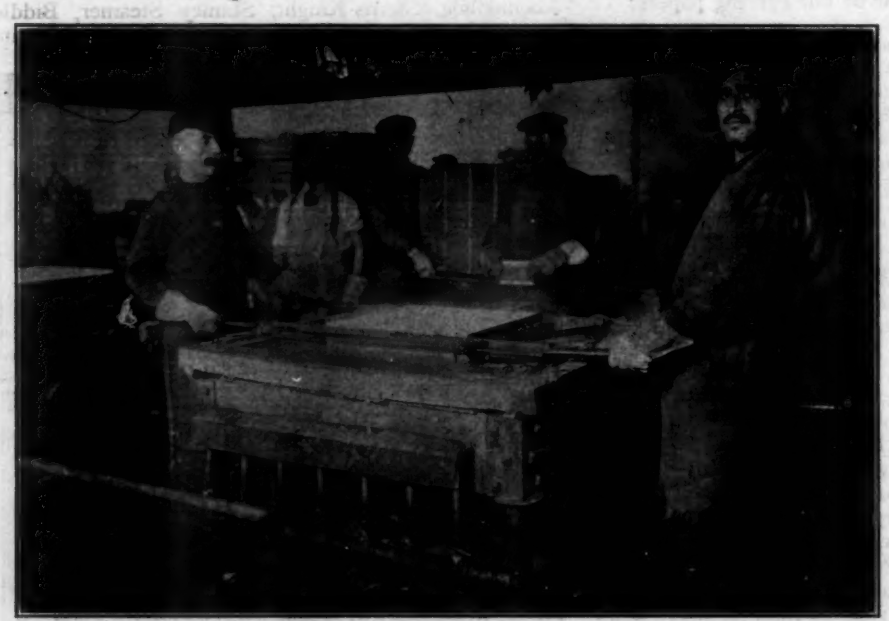


FIG. 2.—SHOWING ASSEMBLING TABLE, WHERE A NUMBER OF SECTIONS OF METAL ARE PLACED, SECURELY CLAMPED IN A DIPPING FRAME, DIPPED IN THE FLUX AND SOLDER BATH, SEALING BOTH FACES AND BROUGHT BACK TO THIS ASSEMBLING TABLE TO COOL

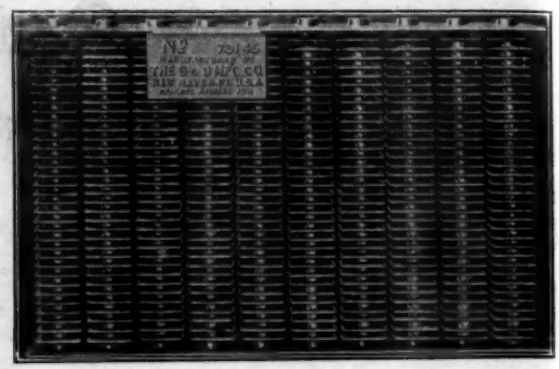


FIG. 4.—SHOWING THE HEADER AND BASE PLATES WITH TUBES AND FINS IN POSITION

This sheet brass of the desired width is passed from large rolls through special automatic machines, which so flute or crimp the edges and centers of the metal that a 1/16th inch space is provided between each section of the unit when folded. After crimping this metal is cut in the desired lengths, folded in the center and the ends sealed by being dipped first in a flux and then in a solder bath as shown in Fig. 1. The section is now clamped in a frame to hold the edges of the unit closely together and both faces are treated in the same manner. (Note frames "A" standing against side wall.) This dipping pan or solder bath is of cast iron, about five in. wide, 30 in. long and contains solder to the depth of about one-half inch, being heated by a special drilled pipe burner.

A number of these sections are placed on an assembling table, securely clamped in a dipping frame provided with two handles on each side, and the assemblage is dipped in the flux and solder bath as shown in Fig. 2. Only a few seconds are required to seal the face, it is quickly removed to the assembling table, turned over and allowed to cool and the other side is dipped in the same manner, completely sealing both faces and leaving a series of channels from top to bottom of the core for circulation.

The large pan is 30 in. square and about six in. in depth, containing about 1,500 pounds of solder. A series of burners fired from opposite sides of the furnace supply the necessary heat. During the heating up operation all burners are turned on full, and as soon as the desired temperature is reached a part of them are turned off and an automatic controlling device maintains a uniform temperature at all times.

FIG. 7.—SHOWING A REEVES' PROPORTIONAL MIXER WHICH SUPPLIES A MIXED GAS TO ALL THE APPLIANCES IN USE IN THE FACTORY

The unit or core is now carefully inspected and gone over with a roller of special design to bring the face fins in allignment. It is now ready to receive the tank and bottom section or frame.

Brass or nickel-silver frames are hammered by hand or machine to the desired shape and specifications of the automobile or airplane manufacturer.

The core and frame, or case as it is sometimes called, are now soldered together on both faces and sides by hand, the radiator supports, hose connection tubes, overflow pipe and filler cap having previously been soldered in place on the frame.

All openings are now securely sealed and the radiator goes to the testing tanks where they are subjected to an internal air pressure of fifteen pounds per square inch. If any bubbles appear when the radiator is submerged, indicating a leak, it is carefully marked, resoldered and tested until perfectly tight. They are now thoroughly dried, polished, again inspected and prepared for shipment.

THE TUBULAR TYPE

Seamless brass tubing is cut to the desired length and square or round fins of thin sheet brass are pushed on the tubes by automatic machines which accurately aligns and spaces each fin a given distance from the other. Each tube is dipped in a solder bath to keep the fins in place on the tube.

Brass plates of the desired length and width act as top and bottom fastenings, for these tubes, which are allowed to extend about one-quarter in. through these header or base plates, the tubes being soldered in place with a special hollow copper. The header plate drillings being so arranged that each tube has an equal clearance from the others and afford the largest amount of radiation from a radiator of a given size. Fig. 4 shows the header and base plates with tubes and fins in position.

The upper reservoir and bottom chamber are of cast iron with the necessary openings cast in place. The

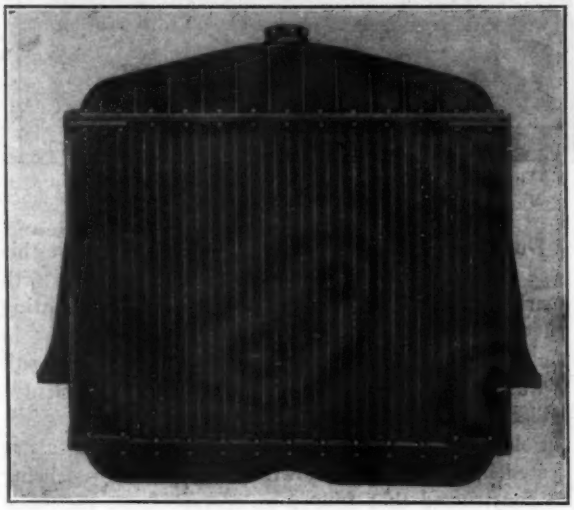


FIG. 5.—AN ASSEMBLED TUBULAR RADIATOR

side supports are also of cast iron with supporting lugs attached. After these castings have been drilled, faced and polished they are ready to be bolted to the header plates. A special gasket acts as a seal between the plates and castings. Testing, inspecting and painting follow and the radiator is completed. Fig. 5 shows an assembled tubular radiator.

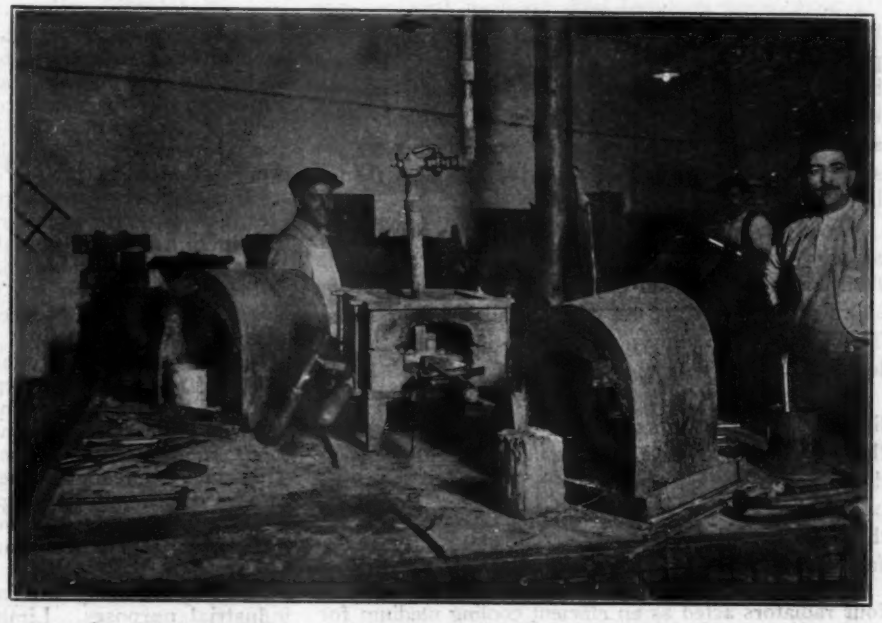


FIG. 6.—SHOWING FIRE POTS IN WHICH SOLDERING COPPERS OF VARIOUS SHAPES AND SIZES ARE HEATED

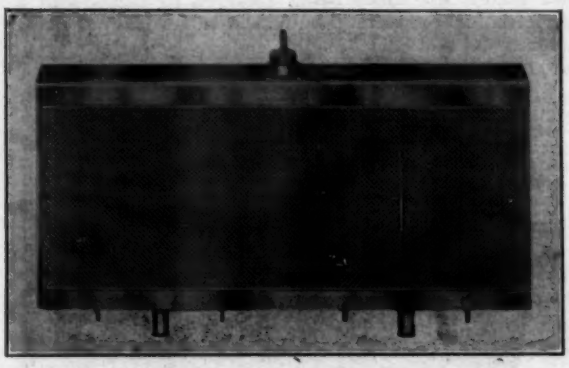


FIG. 8.—RADIATOR USED IN ALL NC PLANES

During an experimental test it was found that this type of radiator would provide adequate radiation with nearly two-thirds of the tubes out of use. By cutting off the damaged tubes and plugging the openings in the plates a transport driver could still operate until it was possible to make a permanent repair or change radiators.

Soldering coppers of various shapes and sizes are heated in the fire pots shown in Fig. 6; this pot being so constructed that four men operate from the same fire. Two fire brick castings are held in place by four bolts from a cast iron top and base plate, a hole is drilled in the upper casting to accommodate the gas burner. Note the absence of smoke and carbon around the furnace entrance, showing that perfect combustion is obtained at all times with the one valve control.

Owing to the cramped quarters in the hardening room it is impossible to obtain a picture. However, it is very complete, being equipped with an oven furnace, case hardening furnace, cyanide, lead hardening and oil tempering furnaces, a high speed steel furnace and several brazing torches and bench forges. Dies used in forming the cases, frames, tanks and other radiator parts, as well as the automatic machines mentioned, were designed by their own engineers, made and heat treated in their own factory.

Fig. 7 shows the Reeves' Proportional Mixer that supplies a mixed gas to all the appliances in use in their factory. You will note that it is mounted on the side wall to allow the use of all available floor space. The mixer at the right and circulating pump at the left with the necessary connections are clearly shown.

The equipment at the English and Mersick and Marlin-Rockwell plants is very similar to the one described, the only exception being in the construction of the large dipping pans, the firing being done from one side of the pan, and the bottom of the furnace so constructed that the heat is held close to the bottom of the pan at the far end.

Fig. 8 shows the radiator used on all the NC planes, four radiators acted as an efficient cooling medium for the four "Liberty" motors that propelled the NC-4 on its historic flight across the Atlantic.

The Definite Attempt Made in England to Make the Most Economic Use of Coal in Gas Making

Keep Competition in Gas Undertakings Looked to in the Future to Offer Most Efficient Gas at Lowest Cost

The story of the lessons which have been taught by the unusual conditions arising from the war will take a long time to fully unfold. The difficulties attaching to many industries have had accompanying blessings. In so many phases of industry organization and economy became early watchwords. Research in the direction of economy was welcomed with open arms and pursued with unusual vigor. Commendable competition in economy of raw materials became the order of the day. In probably no case was this so apparent as in the steps towards the more economic use of a rapidly diminishing output of fuel. The measures which were introduced to compulsorily effect a large reduction in consumption need not now be reiterated. They are generally well known, and the concommitant demand for many of the by-products of coal stimulated fresh inquiry and successful work in this direction. Very valuable lessons were thus brought out—lessons which must now be applied in peace time. when every nerve will need to be strained in the great industrial struggle which has now been entered upon.

On the gas industry, fraught as it always has been with great possibilities in the direction of fuel economy, war restrictions placed a severe strain, in spite of which, however, the industry responded magnificently to the demands made upon it for the supply of essential materials for the production of explosives. Both prior to and during the earlier period of the war changes in practice were coming over the industry. A new order of things in the utilization of gas called for new methods of production and more reasonable methods of standardization. The incandescent gas mantle called for the abolition in England of the old illuminating standard, which in time was superseded by the Standard of Calorific Power (England) Act of 1916. The benefits to be derived by the abrogation of the old illuminating standards were evidenced by the increased yield of gas obtained by the admission of a carefully regulated supply of steam to the base of a vertical retort, with so small a reduction of calorific value that the total thermal value of the gas obtained per ton of coal was markedly increased. Thus in one test this "steaming" led to the production of 15,500 cu. ft. of gas of 510 B.t.u. per ton of coal as against 12,050 cu. ft. of 530 B.t.u. obtained by the ordinary method. Thus from one ton of coal, 7,905,000 B.t.u. were obtained in the form of gas by steaming, as against 6,386,000 B.t.u. by the ordinary process. This advance was accompanied by a reduction of only 2 per cent in the quantity of coke. The chief tendency in the gas industry was to an increased production of gas with a reduction, not always proportionate, however, of its calorific value. Apart from this or some similar system of operation, gas outputs were rapidly diminishing even in the face of enormously increased demand for gas for industrial purposes. Limitations of supply of fuel and unsuitability of coal supplied largely accounted for this. So patent was the difficulty of maintaining

the regulation thermal value of the gas, that official restrictions had to be overlooked, and a poorer quality of gas passed from the product to the consumer. With this reduction in quality the maintenance in quantity by resort to the blue water gas producer was closely associated. Meanwhile the use of a decidedly lower-grade gas was being advocated and debated, and in January, 1919, the Fuel Research Board in England issued its report on gas standards.

More recently, however, further developments, which are destined to affect every consumer are under discussion. In connection with the alteration in the bases of charging for gas recommended in a report issued by the Fuel Research Board in England, the board proposes to include in a forthcoming bill provisions for a recision of the existing standard and maximum prices of gas, and, on the finance side of the gas undertakings, certain difficulties which have arisen in consequence of English statutory limitations in respect of the raising of capital will be dealt with. In regard to advising the most suitable composition and quality of gas, and the minimum pressure at which it should be supplied, with a view to economy of coal consumption, the board recommended that a new system of charging should be adopted, in which the consumer would be charged for the actual thermal units supplied to him in the gas passing through his meter. Thus, in England, with a gas of 500 B.t.u. at 4s. 2d. ($1.00) per 1,000 cu. ft., 10,000 B.t.u. would be supplied per penny, but the exact relation which the calorific standard used in calculating this quantity should bear to the gross calorific value would need to be carefully considered and the gas undertaking would be required to declare the calorific value of the gas intended to be supplied, and, moreover, to adjust the gas consuming appliances to meet any change in calorific standard decided upon. Freedom on the part of the gas undertaking was proposed in the matter of the particular calorific value which best suited its purpose, but in order to avoid unlimited license with its necessary multiplication of fittings, as has been the case in electrical undertakings supplying current at different voltages, it was suggested that some decision should be arrived at in consultation with representatives of producers, consumers and manufacturers of fittings as to the selection of standards of gas. Four such standards were proposed, viz., 400, 433, 466 and 500 B.t.u. per cu. ft., and taking these as minimum figures, adjustment of appliances to admit of increased aeration to suit gases up to the next higher standard should be allowed for. Again, as a straight coal-gas averages from 500 to 600 B.t.u., some system of dilution would become of more general application, and for this purpose blue water gas constituted—in the mind of the board—the ideal diluent in not involving any serious addition of inerts to the mixed gas, it being proposed that the limit to inerts should be set at 12 per cent.

While awaiting the details of the proposed legislation, the still more recent trend of economic gas production may be briefly noted. As was anticipated in England, restrictions on the gas industry did not cease with the signing of the armistice. If anything, in that country the difficulties in maintaining a supply of gas seemed rather to be increased. Serious shortage of coal due to the miners' strike followed by cessation of deliveries owing to the railway strike necessitated very serious inroads being made into the stocks of coal at gas works all over England, which stocks had been maintained with the greatest difficulty, and were of a minimum order. Great Britain is obviously nearing a time when drastic regulations restricting the use of coal for the production of gas and the subsequent restriction of the gas thus produced would be essential. As a result of new restrictions, some gas companies were forced, quite recently, to issue a notice to consumers impressing upon them the necessity for the utmost economy in the use of gas owing to the recent restrictions which had been placed by the board of trade on the companies. Failing such curtailment of consumption, it would be impossible to maintain throughout the day of twenty-four hours, an adequate supply of gas for lighting, heating and cooking purposes. In addition, notice was given that the altered composition of the gas might necessitate some adjustment of burners, and that pending this regulation by competent workmen, a temporary expedient might be resorted to by partially closing up the air ports in the case of burners giving trouble.

That this notice was justified will be readily deduced from the board of trade order, in England, dated September 26. This order, applicable to all gasworks in the United Kingdom, limited the consumption of coal in the production of gas to an amount required only to suffice for a quality of 13 per cent lower than the quality prescribed by any special act or order for the time being applying to these undertakings, and, further, "that no other persons who supply gas shall use or permit to be used in the production of gas a greater amount of coal than will suffice to produce gas of a calorific value not exceeding 425 B.t.u. gross." This reduction of standard to 425 B.t.u., gross, marks, therefore, a definite attempt to make the most economic use of coal in the production of gas for general industrial work; in other words, to increase the output of the thermal value of the coal in the form of gas. A consideration of the stages in the progress on lowering the standard of gas will show how far along the road towards what may be regarded as low-grade gas Britain has traveled under stress of diminished availability of coal for a rapidly increasing demand for gas. The first marked change from 16 c.p. to 14 c.p. followed the introduction of the gas mantle. The rapidly extending use of gas as a source of industrial heat following the introduction of the gas mantle which required no luminosity in the gas itself, led to the abolition of the illuminating standard and its replacement by the calorific standard. This came to be of order of 500 B.t.u., whereas in the earlier years of the gas industry, gas of 550 to 600 B.t.u. was of common origin. But, even while the 500 standard officially ruled, war conditions necessitated a slight reduction of the value, and now—though how temporary the measure may be no one at present can tell—to send out gas of more than 425 B.t.u. becomes an offense against the order which has gone forth. It may, moreover, be observed that a plea for the wide adoption of such low—or even lower—grade has been strongly urged for some time past. It seems, however, clearly established that a more dilute or attenuated or lower grade gas, requiring as it does a smaller volume of air for its complete combustion, yields more perfect combustion, leading to a better utilization of its heat. This, of itself, would constitute an advantage, but there is to be added the fact

that, owing to the variation in the method of production of the lower grade, as more thermal units will be obtained per unit of cost than in the systems evolving richer gas. Assured of a more complete combustion and of more efficient transfer of heat from the flame by properly designed and adjusted burners to the material required to be heated, the thoughts of the consumer will be directed particularly to the important item of cost. Variations of cost, have, for a long time past in England, as elsewhere, moved in one direction only. From time to time the unfortunate consumer facing continued advances in prices, though realizing that these are under control, is somewhat perturbed by the failure of the realization of the promises which have from time to time been made of cheap gas. The conditions at present are abnormal, but it is hoped that in the future, a keen competition among gas undertakings to offer the most efficient gas at the lowest possible cost, may be looked forward to.

Of more immediate interest, however, are the methods which may be adopted to effect the necessary dilution. As pointed out above, the Fuel Research Board in England recommends the use of blue water gas. The plant for carbureted water gas is an adjunct of some, though not all, gas works, and the elimination of the carbureting stage provides a gas without luminosity, and of approximately 300 B.t.u. per cu. ft. for the purpose. In the absence of such a plant other methods would need to be resorted to, and several have been suggested. Dilution with a part of the air required for subsequent combustion has been proposed. It will be noted that this normally occurs in the tube of the Bunsen burner prior to combustion, but the proposal goes so far as to suggest that this dilution should thus be partially effected before the gas is put into the mains. It is a fact that when individual combustible gases are diluted down with the full amount of air required for their combustion a fairly constant thermal value of the mixture is obtained. As a case in point, ethylene and hydrogen have net values of 1,510 and 272 B. t.u. per cu. ft., respectively. Yet when diluted with air to completely self combustible mixtures, these mixtures have thermal values of 99 and 81 B.t.u. respectively. Other diluents, however, such as producer gas and Mond gas are available, and these would to some extent keep down the proportion of inerts, if limits are prescribed, but it would seem that considerably more stress should be laid on the design of the burner, and the structure of the flame produced from it by gas supplied, to obtain the best effects for most ordinary heating purposes. The official decisions on many of these points of more than minor importance will be awaited to interest.

Late Developments in Gas Generated Engineering Appliances

Some remarkable developments have been made of late in engineering appliances generated by gas. Among these is a self-contained gas-fired brazing table suitable for miscellaneous workship practice, but more particularly adapted for toolmakers and aeroplane mechanics. It will braze pipes and tubes, and with a slight modification tips on tools. Its total width is 4 ft. 10 in., height on top of pillars 3 ft. 8 in., weight 12 cwt., and with a half horsepower it has a speed of 300 revolutions per minute. The firebrick table is mounted on a strong cast-iron stand, provided with a bracing shelf, and has a high pressure blower. There are fast and loose pulleys for providing the blast to the blow pipes, which are 19 in. long and have heads on inch in diameter, and nozzles just under half an inch. The pressure can be secured by electric drive if desired. The blow pipes are swivel mounted, so are easily adjusted in any direction. Everything has been done to ensure ease in handling and economy. The work is in sight the whole time, and by means of cocks to adjust gas and air, the heat is under perfect control and localized to the area under treatment. Another advantage of this appliance is that it can be dismantled and packed into a very small space.

For the manufacture of amorphous carbon electrodes, a gas furnace is constructed of a specially prepared refractory material with walls nine inches thick, which enables a temperature of between 450 to 600 deg. C. to be kept up. In some there is a central division in the oven, so that two batches of electrodes can be baked simultaneously at different temperatures. Many of these are installed in iron and steel works fitted with electric melting furnaces, by means of which very considerable savings are effected.

Another type of gas furnace extensively used for metal work, the stoving of enameled gods and insulated wound electric parts of machinery, glass work, and so on, has the gas and air inlets so nicely calculated that the temperature can be reduced as needed, almost simultaneously, by merely regulating the air cock. They are provided with two chambers, thus permitting heating in two stages. With the modern doors it is possible to close the furnace immediately the work is placed in or removed. The crucibles are placed in such a way that the flow of molten metal can be directed as required during pouring. These furnaces have proved particularly successful with nickel, aluminum and copper and its alloys.

Accuracy in the control of the admixture of gas and air is of the utmost importance, and this has caused many firms to turn their attention to this matter. One London engineering firm has placed on the market an automatic gas mixture control for furnaces and other appliances where the air blast is used. When this apparatus is fixed, no matter what may be the variations of pressure of gas or air, or of the resistance to the mixture in the flues, nozzle or furnace, a constant quantity is maintained. This is obtained by ingenious but simple means, chiefly through a Venturi tube placed in the injector. The control is adjusted by means of a screw.

The same firm has introduced a rotary gas compressor, which consists of a positive rotary blower fixed upon a box base, containing the inlet and outlet connections, and has an automatic pressure control and return valve. With this is an eccentric drum blower with four blades. The apparatus is partly controlled by a dash pot full of oil, which not only prevents vibration in the valve, but also provides perfect lubrication. Light feed lubricators are fitted. It is a very handy appliance, capable of serving a whole range of gas apparatus, and securing smooth working under varying loads without waste.

Bringing the Gas Engine Up to a 50 Per Cent Thermal Efficiency

Dana G. Griffin Traces Its Development and Suggests New Fields of Usefulness in Future

The origin of the gas engine is but imperfectly known. It is generally conceded, however, that it dates back as far as 1680, when Huyghens proposed to use gunpowder for obtaining motive power, declared Dana C. Griffin, in a paper before the recent annual convention of the Texas Gas Association.

The method used was a simple and practical one. The explosion was used indirectly; a small quantity of gunpowder exploded in a large cylindrical vessel filled with air, expelled the air through check valves thus leaving after cooling, a partial vacuum. The pressure of the atmosphere then drove a piston down to the bottom of the vessel lifting a weight or doing other work.

These early engines cannot be exactly classed as gas engines. The explosion of gunpowder is so different in its nature from that of a gaseous mixture that comparison is untenable.

The first real gas engine described in our country is in Robert Street's patent in 1794. It contains a motor cylinder in which works a piston connected to a lever, from which lever a pump is driven. The bottom of the motor cylinder is heated by a fire, a few drops of turpentine being introduced and evaporated by the heat, the motor piston is drawn up, air entering mixes with the inflammable vapor, the application of a flame to a touch hole causing explosion and the piston being driven up forces the pump piston down, performing real work in lifting water. The idea was crude to be sure, but substantially correct and was not improved upon for many years.

Introduction of the Compression System

Numerous other inventors followed this early pioneer and in 1838 William Barnett described and fully covered a very ingenious ignition system which made a great improvement in the gas engine and was continued for many years. Later Mr. Barnett invented the compression system largely used in gas engines. It is true, however, a Frenchman by name Lenoir in 1801 described an engine using compression, but his cycle was not in any way similar to that proposed by Barnett. Barnett describes three types of engines, the first, single acting, and the second and third double acting, all compressing the explosive mixture before igniting it. In all three engines the ignition takes place when the crank is passing the dead center, so that the pistons get the impulse during the whole forward stroke.

Previous to 1860, however, the gas engine was entirely experimental. Many attempts were made but none of the inventors sufficiently overcame the practical difficulties to make their engines a commercial success. Mr. Lenoir actually produced the first commercial gas engine; while it was not strikingly novel, he seemed to have more carefully worked out the details that proved a great barrier to the progress of the other inventors and applied the first electric spark ignition.

In 1867 Otto and Langen exhibited at the Paris Exposition their free piston engine. It was identical in principle with inventions of their predecessors, but they were successful in working out details that won success for their efforts.

In 1876 Herr Otto superseded his formed invention by the production of the "Otto Silent Engine" later known the world over. The economy of this engine was superior to any other up to this time and was capable of producing an effective brake horsepower on 24 to 30 ft. of gas per hour, as indicated horsepower on about 20 ft. of gas, showing also, the mechanical efficiency of this engine very closely approached later attainments that were accomplished under far more favorable conditions. This engine really established the gas engine commercially and more than 1,500 were sold representing the work of over 90,000 horses.

Although Herr Otto was considered one of the most successful gas engine designers; he adhered to Lenoir's erroneous ideas and in his patent specification in 1876, he attributes the economy of his engine to the slow explosion caused by the arrangement of gases within the cylinder. The compression, which is the real cause of the economy and efficiency of the machine, he seems to consider as accidental and unessential feature.

What Actually Occurs in Cylinder

The gas engine like all other great inventions, is the result of long continued labor of many minds. It is a gradual growth due to the united labors of many men. In the early days explosion was as much in the minds of the inventors as steam, but the mechanical difficulties proved too great. The construction skill at the time was heavily taxed by the crude steam engine of Newcomen and still more unequal to the inventions of James Watt. In 1774 Watt ran his first successful steam engine at the Soho Works, Birmingham, England. Twenty years later, 1794, Street's gas engine patent indicated the direction of men's minds, seeking a rival for steam engines before steam had been completely introduced. The experience and skill in the design and construction of the steam engine made the gas engine more interesting and possible.

A little consideration of what actually occurs in a gas engine cylinder at each explosion will show that the early engineers had troubles of their own to contend with. Platinum, the most infusible metal used commercially, until very recently, melts at about 1,700 deg. C. The ordinary temperature of cast iron flowing in a cupola is about 1,200 deg. C. A temperature very usual in a gas engine is 1,600 deg. C.—a dazzling white heat. The whole of the gases filling the cylinder are at high temperature. If it were possible to see the interior it would appear to be filled with a blinding

glare of light. At first glance it seems strange that such temperatures could be used with impunity in a working cylinder, but here the convenience of method becomes evident. The heating being quite independent of the walls of the cylinder, by the use of a water jacket, they can be kept at any desired temperature, the metals themselves not exceeding the boiling point of water more than a few degrees.

In the early gas engine patents, numbering several hundred, there were no essential differences between the inventors' claims. The working process of the different types may be defined as follows:

(1) Engines igniting at constant volume but without previous compression.

(2) Engines igniting at constant pressure with previous compression.

(3) Engines igniting at constant volume with previous compression.

The first type is the simplest idea, the third type, however, was the best type of compression engine and greatly predominated in number, this type commonly known as the four cycle, whose speed was controlled by closing intake valve and cutting out working strokes.

In summing up the achievements of the early inventors of the gas engine, it is conceded that Dugald Clark had the most comprehensive idea of compression in gas engines than possessed by his rivals, and to him is accredited the first successful two cycle engine. This engine was exhibited by him at the Royal Agricultural Show at Kilburn, England, in 1879.

In passing the varied achievements in design and construction of the early gas engine, we would fall far short of a great privilege were we not to give cognizance to the efforts of the late George Westinghouse, president of the machine company that bears his name. To Mr. Westinghouse must be given the credit for improving the throttling type governor for gas engines, whereby the mixture, varying the intensify of explosion at each stroke controls the speed and power., instead of controlling the number of explosions per minute as was the former practice. So successful were his efforts in the development of the stationary gas engine, perfecting a uniform rotative speed, by the use of the throttling governor, many of the early electric generator sets built by him are still in daily operation.

Present Design and Performance

In presenting this feature of our discourse, we fully recognize that we invite criticism and maybe, challenge, from those who are directly interested or have different views as to the essential features entering into the design of the *modern* gas engine, therefore, to safeguard the writer's position, we state in the outset, that we accept as a matter of fact, that both horizontal and vertical engines are acceptable in modern practice. From our own engineering experience and observations, however, we are compelled to express our personal preference, for the vertical multiple cylinder four-cycle type internal combustion engine.

Knowing that the time apportioned for this part of your entertainment would not permit of a lengthy discussion of the technical reason which would be introduced to satisfactorily compare the different types of engines, will beg this issue by stating that the modern vertical type internal combustion engine is generally accepted by the engineering fraternity and buying public to be best suited to meet the average power plant requirement. Briefly stating a few of the specific features that recommend the vertical engine, minimum floor space, more uniform speed by divisibility of torque, less noise from exhaust, more accessibility of reciprocating parts and the practical elimination of vibration.

While there has been and even yet we may expect a degree of prejudice against the gas engine, the fact that it has thoroughly established its dependability and won a useful place in the forefront of our most economical power plant design, is fully accepted in modern practice. The gas engine has been thoroughly tested and extensively applied to practically every branch of commercial industry and in passing the so-called "experimental" stage, has established a service record not approached by any other type prime mover. These engines have been developed and refined as demanded by the varied requirements until to-day very little attention is necessary while operating, the automatic governor taking care of the load changes, the improved lubricating and dual ignition system permits of a continuity of operation that meets every demand.

While the present state of the gas engine has received the stamp of commercial approval, it is interesting to know, that not yet has its more wonderful possibilities been fully explored. With a modern gas engine a thermal efficiency of 27 per cent is easily obtainable, leaving the residual heat units diffused approximately as follows: Radiation, 3 per cent; exhaust losses, 38 per cent; water jacket losses, 32 per cent. It is by an ingenious device that we may soon see the major portion of the heat units recovered from the existing circulating losses and converted into useful energy in the shape of steam. Already a sufficient number of installations have been made to demonstrate the practicability of this heat recovery system and in several instances, sufficient heat is recovered to heat the building and supply hot water for domestic purposes. When due credit is given for the actual amount of energy recovered from this source, the thermal efficiency of the gas engine very closely approached 50 per cent of the total British thermal units supplied.

The application of the gas or internal combustion engine to self-propelled vehicles, launches, airplanes and especially the automobile, has greatly stimulated research efforts in this branch of engineering and evolved from its vast school of application, thousands of expert mechanicians whose daily achievements ridicule the pessimist's claim, "It'll never do it." Not in small degree has the educational uplift of the country been promoted by the advent of the internal combustion engine. This fact is wonderfully reflected in the minds of our boys and girls and it is almost the exception to-day, to find a boy who is not quite conversant with the subjects of "compression and ignition." By the term, gas engine, therefore, we mean compression or heat engine and this is true whether using gas manufactured, natural gas or making its own gas by carbureting air on its way to combustion chamber of engine.

Many of the Opinion that Time Has Come When Gas Works Ought to Send Out a Greater Proportion of Coal's Potential Energy

William A. Bone Would Not Have Importance of Composition of Gas Minimized to Too Great a Degree in Favor of Its Thermal Content

Coal is so valuable a material that we ought as far as possible to avoid burning it in the raw state; but in our present state of industrial development it is difficult to realize this ideal. We ought always to aim at the recovery of valuable by-products. Certainly, the world's industrial development is already so far advanced that we can say that all coals intended for use in the smelting of iron and steel and in gas-making, and I hope in the near future also for domestic consumption, should be carbonized in some way or other before use, declared William A. Bone, in a paper before the British Royal Society of Arts.

Uses of Coal in Which Complete By-Product Recovery Is, or Should Be, Possible

Coking (iron and steel works), gas-making (gas works), domestic, was, say, 45 per cent of the nation's total consumption.

In 1913 we actually carbonized: 10 per cent in gas works, 7 per cent in coking plants, equaled 17 per cent.

If we take the consumption of coal in the United Kingdom for the three purposes named, we find that it is 45 per cent of the whole. So that we ought now, or in the near future, to be able to carbonize some 45 per cent of our total consumption. I find that in 1913 we carbonized approximately 10 per cent of the coal in gas works, and about 7 per cent in by-product coking plant, or a total of 17 per cent only. We might have carbonized about 25 per cent. Certainly we ought soon to realize more than this figure, in view of the possibility of carbonizing part of our domestic supply.

A partial recovery of by-products ought also to be possible in regard to the coal consumed for power purposes. It should be our object to investigation or research to try to expand the possibilities of by-product recovery in regard to certain classes of our coal that are used for power production. I do not say we shall find it possible, or even desirable, to carbonize, either partially or completely, all the coal required for power production. I am not putting forward an ideal like that. We are not yet far enough developed; but at present we ought to be devoting ourselves to investigating the possibilities in that direction.

Let us consider what we are likely to get out of coal carbonized at a low temperature. I mean by "low" a temperature between 500 and 600 deg. C. If we carbonize at this temperature, we ought to select a coal that will give a residue which is either naturally coherent or which can easily be briquetted under pressure. We shall obtain from it, as a rule, about 70 to 80 per cent of its weight of what I call "semi-coke." This "semi-coke," if it could be prepared in a condition that would stand transport and distribution, would be an excellent fuel for burning in household fireplaces. Then there is a comparatively large amount of condensable tars or liquid products. These products would consist chiefly of what the chemists call the naphthene series of hydrocarbons. There is here one very important difference between low and high temperature carbonization. You have all heard how the benzols and toluols (the benzol hydrocarbons) have played an extraordinarily important part in the war. We derive from them the high explosives which we have used so effectively in the war. They are also the basis of coal-tar dyes; and we also prepare from them a number of synthetic drugs, disinfectants, etc. These valuable hydrocarbons are not found in the tars produced at low temperatures. According to investigations made in my own and other laboratories, low-temperature tars are mainly composed of hydro-benzols. These, and not the benzol hydrocarbons, are the chief constituents of the tars produced in low-temperature carbonization; and the amount is about 6 to 10 per cent of the weight of the coal, according to the kind of coal. In addition, a small amount of fairly rich gas is obtained, varying with English coals from 2,500 to 4,000 cu. ft. per ton, or more in the neighborhood of 3,000 cu. ft. than any other figure. This gas is very rich in paraffin hydrocarbons—methane, ethane, etc., but it contains only a small proportion (less than 15 per cent.) of hydrogen. One other important point I must not forget. At such low temperatures we do not get much ammonia. It would not amount, as sulphate of ammonia, to more than between 6 and 8 lb. per ton of coal.

Commercial Prospects of Low-Temperature Carbonization

The chief difficulty about the wider adoption of low-temperature distillation is a commercial one. The prospects would be decidedly good if only a good "semi-coke" which will stand transport could be produced. Another difficulty is that the present commercial value of the tars is not great. The naphthenes could be used as motor spirit and fuel oil. But they cannot be made the basis of coal-tar dyes, unless indeed they are cracked; and then the coal might just as well be distilled at high temperature straightway. It is quite possible technically to carry out the low-temperature process; but the commercial prospects have so far not been very encouraging, although changing circumstances may favorably affect them. I for one hope to see the day when low-temperature carbonization will not only be more technically perfect than it is now, but also when the commercial prospects of it will be better. And there are already signs of that day arriving perhaps more quickly than some people think. I myself have quite an open mind on the subject, and think that possibly some "intermediate" temperature (say *circa* 700 deg. C.) may be found to yield a sufficiently good com-

bination of results to make it an attractive commercial proposition.

At any rate, it seems worth trying, in view of the need of a "smokeless" domestic fuel and of larger supplies of motor spirit and fuel oils generally.

High-Temperature Carbonization

Let us now consider carbonization at high temperatures, by which I mean at temperatures from, say, 900 to 1,100 deg. C. If a suitable coking coal is chosen from among the hard coking series a hard metallurgical coke is produced. Also benzene, toluene, benzenoid and phenolic tars, plus a considerable amount of ammonia, are obtained. The resulting "coal gas" also contains a number of constituents, the nature of which we shall discuss later on. High-temperature carbonization has been carried out in this country on a large scale for about a century, and is so well-established an industry that its prospects do not require talking about, because they have already been realized. Now the important question arises: How, in the public interest, should this process of high-temperature carbonization be carried out in future, and what should be aimed at in regard to public gas supplies? I, therefore, propose to discuss one or two changes that may possibly come over the carbonizing situation. We are at present in a state of transition or flux. A great many competent people are thinking about carbonization problems, and what our future policy should be. They do not all agree; and I may have to refer to proposals with which I do not personally agree. But I think it right to give you as far as possible not only an unbiased, but a reasoned, statement of the pros and cons of the various suggestions that have been made.

When the best types of British "coking coals" are carbonized in coking chambers, with by-product recovery plant attached, for the manufacture of hard metallurgical coke, there are usually obtained:

	Percentage of Weight of Dry Coal.
Coke, between	67.0 and 75.0
Tar, between	2.5 and 4.0
Benzols, between	0.6 and 1.4
Ammonium sulphate, between..	1.0 and 1.4

Surplus gas: Between 3,000 and 5,000 cu. ft. per ton.

The "debenzolized" gas contains:

CO_2 = 2.5, CO = 6.5, CnHm = 2.0, CH_4 = 25.0, H_2 = 55.0, and N_2 = 9.0 per cent.

and its gross calorific value, per cubic foot at 15 deg. C. and 760 mm., is approximately 485 B.t.u.

When "gas coals" are carbonized in gas works retorts, similar products are obtained, the chief difference being that the coke yielded is inferior, both in quality and quantity, to that obtained in coke ovens, while the gas is richer and more abundant. Also, whereas coke ovens are fired by a portion of the "debenzolized" gas (about half of it is so required), gas retorts are heated by "producer gas" generated in the setting from part of the coke produced. Thus, for example, a good Derbyshire gas-coal yielded, when carbonized at about 1,000 deg. C. in horizontal retorts:

Coke = 63.0 per cent of the weight of the coal charged.

(N. B.—About *one-eighth* part of this coke was used to fire the setting.)

Tar = 10.5 gallons (sp. gr. = 1.19) per ton of coal.

Ammonia Sulphate = 28.5 lb. per ton of coal.

Gas = about 12,000 cu. ft., at 15 deg. C. and 760 mm., per ton of coal.

The gas contained:

CO_2 = 2.60, CO = 5.20, CnHm = 3.30, CH_4 = 34.00, H_2 = 43.50, N_2 = 11.40 per cent.

Its calorific values would be about 590 (gross) and 520 (net) B.t.u. per cubic feet at 15 deg. C. and 760 mm.

If the heat balance of such a process were investigated, it would be found that, after deducting the coke required for firing the setting, the potential energy of the residual coke available for sale would be about 50 per cent, of the gas about 25 per cent, and of the tar about 5 per cent, that of the coal carbonized. In other words, the thermal efficiency of the process would be about 80 per cent, which, it must be admitted, is a very satisfactory result. Indeed, it has been stated that the two Metropolitan Gas Companies, which in the year 1913 carbonized 3.114 million tons of coal (or about one-fifth of the total carbonized by all the authorized gas undertakings in the Kingdom), actually sent out of their works, in the form of coke, gas, and tar, a little more than 70 per cent of the potential energy of the coal taken into them. The gas actually sold accounted for nearly 25 per cent of the total energy of the coal employed in making it. It would thus appear that, taking the process as a whole, the thermal efficiency is commendably high.

Nevertheless, many competent judges are of the opinion that the time has come when gas works ought to send out a much greater proportion of the potential energy of the coal in the form of *gas* than they have hitherto done, and the endothermic interaction between steam and incandescent coke, productive of "water gas," is readily available for such purposes. In other words, a combination of "carbonization" and "water-gas" processes is now advocated as a means of increasing the proportion of energy sent out in the gas, at a corresponding sacrifice of part of that hitherto made available in the coke.

Steaming Vertical Retort Charges

Investigations have been made with the object of trying the effect of introducing steam under pressure at the bottom of the vertical retort during carbonization. The idea is, of course, to utilize the heat in the incandescent coke to generate water gas; and this gas passing upward materially assists in the distribution of heat in the retorts. These steaming experiments have been highly successful, and it is probable that the practice of steaming the charges in vertical retorts will become common. I may quote the results from one series of experiments.

Steaming of the Charge

(Steam introduced at 40 lb. pressure through a ⅛-in. nozzle.)

Result: 16,600 cu. ft. of gas per ton (instead of 14,000 cu. ft. without steam).

Percentage composition:

CO_2	CO	CnHm	CH_4	H_2	N_2
3.7	17.1	2.2	20.0	57.2	5.0

British thermal units in gas per ton = 8,386,000, or,

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As the Journal Views It

Once Started It Pays to Keep Going

When the company that sends out a million cubic feet finds that it isn't making enough on the undertaking to much more than pay expenses, when it fights for, and, after long delay and expensive litigation, gets a petitioned increase, then finds that expenses have mounted to such degree that it isn't any better off than it was in the first place, the genius who comes in to demonstrate how he can raise its load to a million and a half is more apt to get the boot than the fabulous reward that his anticipations have led him to expect.

If there has ever been a time in the gas business when the temptation to "lay down" and moan "What's the use?" than exists at present, that period was not blessed with a historian adequate to his task.

But all of us feel, all of us know, that brighter days than the gas industry has ever had, lie directly ahead.

It may take readjustments, almost revolution, in our methods, our markets and our viewpoints, to bring these hopes to materialization, but materialize, inevitably, they must.

Perhaps we may cease to regard gas itself as the field of our profit. We will still want our water heating loads, our cooking loads, our house heating loads, our industrial loads, our lighting loads, and to a vaster degree than ever before dreamed of, but only that we may with the least waste produce our by-products, in which our real profit will lie.

So for the present it is not good business to decide that when the added thousand feet add nothing to our profit, perhaps even reduce slightly the margin between that and actual loss, we will not seek but rather avoid that extra thousand feet.

We are in a period of transition. Some do not feel competent to judge which way the cat may jump.

But activity in any event is preferable to stagnation. Going down snapping is preferable to disappearing from the scene yelping and with tail between the legs.

We do not know what the future will unfold? Well, then let us mind our business in the way time has demonstrated is good business until we find out.

Rates, many are inclined to the belief, will never prove our salvation. Cheaper gas even, in times when the cost of making gas is at its highest, is the way out that numbers are beginning to incline to.

Cheaper gas may be attained by less labor in its making in proportion to its volume, greater efficiency in manufacture, greater yields per ton of coal carbonized and less loss in distribution—all somewhat slim hopes in view of present-day attainment—or making gas as an enabling by-product towards products which may be sold without restriction as to price.

If this is our belief, then all the more reason why we should keep moving, why we should go on building up our load factors even if the additions do not go far in themselves towards building up our bank balances.

In the present day world the man of the stiff upper lip is an essential. If he doesn't happen to be around in sufficient numbers then all of us, to save time, might just as well busy ourselves folding up our tents right now.

When progress ceases then indeed we are damned. And it takes a man of spunk to keep on going when no incentive exists to spur him on and when, in fact, he isn't altogether certain which way he is headed.

It's infinitely more respectable and admirable to burn out than rot out. SO let's keep moving!

If It's Not One Thing It's Another

Well, if it's not one thing it's another.

Competition and serving gas in the most efficient and economical manner to the domestic consumer are inharmonious elements.

Here we have been showing the public how much money our undertakings have cost us, and the public, viewing our visible properties, skeptically inquiring: "How did you manage to spend all that money on that?" totally forgetting, of course, that a good part of the investment frequently has been in extravagant purchases forced upon us by the public through its elected crooked officials selling out franchises to competing undertakings launched to make their profit, not through conducting a gas business, but through compelling us to buy them out.

If there is any kind of competition the gas business has not at one time or another struggled against, it is always of interest to have it pointed out. And last week our news columns did just that for us.

In the pride of our monopoly of the domestic business we have somehow gotten the notion that we had a monopoly on all kinds of business where gas is required.

So when our far-sighted ones started to point out to us the prime advantages of gas fuel in industrial works and allured us with promises of the richness and boundlessness of the field, we just a little condescendingly concluded we would take on whatever of it we desired, but at our own terms.

We moved slowly for there was nothing to hurry us. Didn't we own gas. And few of us tried any gymnastics as to altering our rates, as justice might have seemed to suggest, in favor of a customer who, by his large usage cost us a mere fraction of the expense per cubic foot that our average consumer did.

Now comes along a by-product company with some surplus gas to sell. It looks with eagerness upon the industrial gas fuel possibility. It looks good to it and it concludes to sell. The local gas company whose market was invaded didn't like the idea at all, and rushed to court. The court apparently has concluded to let the by-product company go ahead.

This opens up interesting possibilities. The isolated by-product plant, run as an individual undertaking, is not apt to prove particularly troublesome to the average gas company for some time to come in the industrial fuel field.

But gas is the logical fuel for a large variety of industries. And the industrial user of gas is frequently an immense user. A difference of ten cents a thousand cubic feet may mean in the course of the year to one industrial consumer ten thousand or more dollars. If by grouping with several other industrial consumers this concern could take the output of a by-product plant and by erecting and operating one so it could get its gas at, say, fifty cents a thousand—a figure by no means impossible—less than the gas company would sell it, this concern would save fifty thousand dollars a year; a quite decent saving.

When the big and even little industries—by grouping themselves become big—decide that gas is their logical fuel, which, sooner or later they will, we can expect such developments, unless they are forestalled.

And we thought the supply of industrial fuel gas—except where denied by producer gas competition—was entirely our monopoly? Well, it will be if we can supply it at such rates that it will be more advantageous to industries to buy from us than to manufacture themselves. And we can do this by ceasing from relying on the rainbow of increase in rates as the means of our continued existence. These are merely a makeship, necessary for the time being, but destructive in the long run.

We must find the means to sell gas cheaper and at higher profits.

Our best thought must be directed towards this end

with higher yields per ton carbonized, less labor per thousand feet made, less waste and loss or by utilizing the by-product oven as the most obvious solution judged by present-day conditions.

Many of the Opinion That Time Has Come When Gas Works Ought to Send Out a Greater Proportion of Coal's Potential Energy

(*Continued from page* 514.)

say, 28.0 per cent of the potential heating value of the coal.

The coal used normally gave 14,000 cu. ft. of gas per ton. Steam was introduced at 40 lb. pressure through a ⅛-in. nozzle; and the result was that the gas production went up to 16,600 cu. ft.—or an increase of 2,600 cu. ft.—containing some 20 per cent of methane, 57 per cent of hydrogen, and 17 per cent of carbonic oxide. In the ordinary carbonization process, the potential heat in the gas was about 23 per cent of that of the coal. By steaming, this was increased to 28 per cent, at the sacrifice of some of the coke. If it is desired to get more heat units into the gas, then this policy of steaming retorts is to be commended.

Effect of Gasifying the Whole of the Coke

There is, however, a further possibility to consider. Many people believe that, instead of our gas undertakings selling both coke and gas, as heretofore, it would be better for them to gasify the *whole* of the coke in a water-gas generator, and to send out, through the public mains, a mixture of blue-water gas and coal gas. In this way, there could be produced, and sent out from the works, about 50,000 cu. ft. per ton of coal of a "mixed gas" of somewhat the following composition:

$CO_2 = 3.5$, $CO = 35.0$, $CnHm = 1.0$, $CH_4 = 7.0$, $H_2 = 50.0$, and $N_2 = 3.5$ per cent.

Its calorific values would be 370 gross and 320 net B.t.u. per cu. ft. at 15 deg. C. and 760 mm.

Looked at from the standpoint of thermal efficiency, the total energy sent out in the form of gas from such a works would now be about 57 per cent of that in the coal taken in, or, say, about 62 per cent if the thermal value of the tar produced were included in the balance. The adoption of such a plan, while it would involve a very considerable gain in regard to the proportion of the coal energy sent out as gas, would mean, on the whole, a marked diminution in thermal efficiency as compared with present practice. But its advocates claim that, inasmuch as gas can be burnt with greater efficiency than coke, the public would be the gainer by its adoption. Also, they aver that the public would get heat units in the form of gas more cheaply than they would otherwise get them under a continuance of the older practice.

Future Standards of Public Gas Supplies

It is, however, manifest that were such proposals as the foregoing to be adopted, either wholly or in part, the whole question of the "standards" of public gas supplies would have to be reviewed and radically altered. The public would in future be supplied with a practically non-luminous gas of much lower calorific value, but somewhat higher calorific intensity, than that to which they have hitherto been accustomed. And, also, the new gas would, on account of its high CO and low CH_4 contents, not only be more poisonous, but also have a wider range of explosibility with air, than the old-fashioned coal gas. It would indeed be a totally different kind of gas, and possibly the British public would not take kindly to it, in which case the business of the gas industry would undoubtedly suffer.

A very important proposal has recently been put forward by Dr. Charles Carpenter, the chairman of the South Metropolitan Gas Company, namely, that in future gas shall always be sold on a thermal basis only, and that the consumer shall be charged, not so much per 1,000 cu. ft., as hitherto, but so much per 100,000 B.t.u. supplied to him. Let us see how this is likely to work out.

It may be at once admitted that this new proposal has many advantages, and, on the face of it, it is eminently fair. The consumer will know what he is buying, and the undertaking supplying him will no longer be able to charge him for a lot of "inert" gases that, under the present system of charging by "volume," are often sent out in the gas. It would no longer be possible for gas managers to draw air through their retorts with a view to increasing their gas yields and revenues, and gas undertakings would not benefit, but rather lose, by such questionable practices. From this point of view, I like Dr. Carpenter's proposal.

There are, however, certain objections—I do not say fatal objections—to it, which ought to be considered at this stage. In the first place, the new proposal seems to involve another proposition, namely, that the economic value of a gas can be referred to a purely thermal basis, irrespective of its chemical composition and of the concentration of the energy in it. It brings to mind an expression, coined in the gas industry, that *"one B.t.u. is as good as another."* With a person who is unfamiliar with the chemistry of combustion, such a plausible expression may find favor; but no chemist who views the matter from an independent standpoint, in the light of present-day knowledge, is likely to subscribe to it, and I venture to deny it. Time does not permit of my examining this popular dictum as thoroughly as I should like, but I will, as briefly as possible, indicate some of the grounds of my objection to it.

First of all, taking the question of "concentration," I venture to think that it is not altogether a matter of indifference to the community whether the public mains are used to convey a gas of, say, 600 or of 400 B.t.u. per cu. ft. And if I want to feed a large furnace, it matters a good deal which of the two gases I am supplied with. Also, I am prepared to advance, if need be, a number of valid reasons, proved on scientific investigation and supported by practical experience, why the chemical composition of a gas, as well as its thermal value, is of importance to a consumer.

Next, let us consider the matter for a moment from the standpoint of public safety and convenience, remembering that whoever uses gas has to burn, not gas alone, but an explosive mixture. It would be foolish to frame a policy on the supposition that gas is used by scientific and technical people only. On the contrary, it is mainly used by a great variety of inexpert people, from Mary Jane in the kitchen upwards. And when such people have to use cooking and heating appliances involving the burning of explosive gas and air mixtures, it is

necessary that the conditions should be rendered as safe and fool-proof as possible for them.

From this point of view, it is important to compare the properties of the three chief constituents of coal gas and water gas, namely, methane, hydrogen and carbonic oxide, in somewhat the following manner:

Comparison Between Methane, Hydrogen and Carbonic Oxide

	Methane.	Hydrogen.	Carbonic Oxide.
Gross and net calorific Values B.t.u. per cu. ft. at N.T.P.	1,064 / 951	843 / 287	341
Range of explosibility of mixture with air — per cent gas....	5.6 to 14.8	4.1 to 71.5	12.4 to 73.0
Relative radiation from flames	4.4	1.0	2.4

Thus it will be seen (1) that a cubic foot of methane represents about three times as much potential energy as a cubic foot of either hydrogen or carbonic oxide; (2) that methane has a very much narrower range of explosibility with air than either of the other two; and (3) that there are wide differences between the "radiating" powers of their flames. Moreover, in small pipes (2 to 3 in. diameter) the rate of propagation of flame through the most explosive mixture of methane and air is comparatively small (not greater than 100 centimeters per second); on the other hand, the most explosive hydrogen-air mixture will propagate flame at the rate of 500 centimeters per second. Lastly, while it is very difficult (some would perhaps say impossible) to set up "detonation" in methane-air mixtures at the atmospheric pressure, it is comparatively easy to do so in hydrogen-air mixtures, which readily develop dangerous explosions. If the advocates of the new proposal are prepared to argue that it is a matter of indifference whether or not the gas supplied to the public has a wide range of explosibility or not, I must beg leave to disagree with them, and to stipulate that it should contain a certain minimum proportion of methane in order to render it safe and convenient to be handled by ordinary people.

Or again, let us compare the properties of hydrogen and carbonic oxide, which in this connection have a peculiar interest because their calorific values per cubic foot are nearly the same. Therefore, some may say, it is immaterial whether a consumer is supplied with one or the other of them. Wait, however, until he has an escape, and it may make all the difference between this world and the next for him according to which of the two he has. Or, supposing his pipe system is immune from such an accident, and that he is using the gas either for furnace purposes or in a gas engine, he will soon find out that, on account of its superior "radiating" power and slower rate of flame propagation, carbonic oxide is far preferable to hydrogen for such purposes. Indeed, any steel-works manager will tell you that while he wants the producer gas supplied to his open-hearth furnace to contain a large proportion of carbonic oxide, he would object to the presence in it of more than about 12 per cent of hydrogen. Also, in running large gas engines for power generation in connection with iron and steel works, we know how much better they work on a gas whose combustible constituents are mainly carbonic oxide than on one correspondingly rich in hydrogen. And I venture to think that anyone who has closely studied the modes of combustion of the two gases will also come to the same conclusion.

I, therefore, put it to the gentlemen who are propounding these problems for us, that it is not true to say it is a matter of indifference as to how the potential heat units are present in a public gas supply; and that the cumulative results of scientific research, supported as they undoubtedly are by practical experience on large-scale working, prove that the fundamental properties of the explosive mixtures formed by different combustible gases with air, arising from their own chemical properties and modes of combustion, do affect profoundly their uses for power and heating purposes. Moreover, in regard to a domestic gas supply, I would add that public safety and convenience alike require that it should not be allowed to contain more than a certain maximum proportion of carbonic oxide and less than a certain proportion of methane; and I would suggest provisionally that these limiting proportions might well be fixed at 20 per cent in each case.

In conclusion, I would like to urge that a question of such moment should not be finally decided without reference to some *ad hoc* committee, specially set up for the purpose, which shall be representative of the ablest and most experienced scientific men and technologists who have specially studied carbonization, gaseous combustion, and industrial heating problems, many of whom have as yet had no opportunity of expressing their views on the matter. And considering that there is no great urgency about it, I deprecate any undue haste in coming to a decision, and especially any attempt to "rush" through legislation, or even departmental regulations on the subject, before all parties (and particularly those representing the general consumer) have been fully heard.

I am decidedly of the opinion that the gas industry ought not to be allowed an unrestricted freedom, which some of its extreme partisans apparently desire, with regard to the quality and composition of the commodity which it supplies, and that its voice ought not to predominate in the matter. It has rightly set up and maintained its own committees to investigate and report upon its problems; but while their findings will command respectful attention, public policy requires that they shall not be accepted without reference to some quite neutral tribunal. For it is the public interest, and not that of the industry, which must predominate in the final settlement of all such questions. I believe that great changes in the present methods of manufacturing gas are both necessary and inevitable, and that, subject to the modifications and safeguards already indicated, Dr. Carpenter's proposed reform in regard to the selling basis of gas is one which, in principle, might well be adopted.

Public Service Commission Reports Slow Meters Rather Than Fast

The Consolidated Gas Company of New York announces that the official figures of the Public Service Commission show that during the month of October there were 906,591 gas meters in use in the city of New York and the Bronx. On complaint of consumers fifty-one meters were tested by the Public Service Commission. The result of these tests showed that twenty-seven of the meters were operating correctly, fourteen were "slow" (not measuring all the gas the customer had used), eight were "fast" and two of the meters failed to register at all.

There Is No More Convenient and Modern Help for the Home than Gas as Used Through Appliances

William Gould Says Advantage of this Opportunity Must Be Taken by Proper Selling Methods — By Advertising and Getting Home to Customers Facts of Interest in a Way They Will Understand

An important phase of the present situation in the gas industry as compared to a year ago, is the fact that practically all the gas companies (in the New England section) have shown, in the past twelve months, a falling-off in gas output. To those who have studied the situation carefully, it seems obvious that the reason for this has not only been the easing up of the coal situation, but has been because the gas companies were co-operating with the Government during the past two years in not actually pushing gas merchandise, but rather devoting their time, energy and advertising space to war work. It is the consensus of opinion of every gas man to whom I have spoken, said William Gould, in a paper read before the Gas Sales Association of New England, that the letting up and decrease in the sales of gas appliances has brought about the decrease in gas output as compared with a year ago. Out of the twelve months some companies have had only one or two months' decrease; some companies, more; but the facts still remain that there is not, to my knowledge, a gas company in New England which in the last twelve months has not shown some monthly decreases in its output over the previous year. With the present high price of materials and labor; with the fact that we have very nearly reached the peak in the rates to the public, and with no immediate lessening of prices for our material and labor, only one conclusion whereby the gas companies may be helped can be reached. That is increasing their output, not altogether by increasing their customers, but by increasing the output per meter. This, gentlemen, to my mind can only be done by increasing the sale of gas appliances to our customers and by showing and proving to them that gas is a modern household aid and that using their gas appliances in the winter time, as well as the summer, will cost them less, save them inconvenience, dirt and labor.

By doing this we will help to bring our inconsistent winter valleys of our output up to a more consistent level with our summer load.

Mr. Gould's paper covered his research work on sales of *Gas Merchandise Per Meter Per Year*. The balance of it follows:

"It is most important in getting down to actual figures regarding gas merchandise per meter per year to appreciate and realize the important position that merchandising holds in the gas industry to-day.

"At several conventions and committee meetings that I have attended, both in the gas and electric industry, the main topic discussed is the sales department and the wonderful chances that at this time it has, not only as a sales department in the old sense, but in rather a new light, that of being the mainstay and greatest hope that our industry has, not only to develop, but to save it.

"If we will look into the present situation a little further perhaps we may find the reasons why this is true, and so as salesmen appreciate fully the responsibility placed on us and realize these opportunities for us to build up our importance and position in the industry as well as building up the industry itself.

"In the first place we all know that while the prices are higher than ever before, it is also proven by deposits in the savings banks throughout the country and investments made in the Liberty Loans, that the people who make up the customers in the gas industry never have had so much money at their disposal and never were in a better position to buy things which make their homes comfortable. This can be easily appreciated if we will consider the effect that prohibition is having and will have throughout the country. Millions of dollars which were heretofore spent for drink will be diverted into the channels and establishments that go to fit up and make comfortable the homes. This can be more fully understood when you consider the appliances that are going into the homes to-day and look back two years. You will then realize that the natural outlet for the money heretofore spent in drink goes toward fitting up the home.

"We, in the gas industry, feel and

know that there is no more convenient and modern help for the home than gas as used through appliances. Realizing that the householder is not as familiar with this fact as we are, we readily see that, while we have a wonderful opportunity to sell enormous numbers of gas appliances to the homes in our towns, advantage of the opportunity must be taken by proper selling methods; advertising and getting home to the customers facts which will interest them and which must be put up to them in a way they will understand.

"It should be interesting to find out what our appliance sales per meter are for the year and compare them with other companies' figures to find out how we stand. No companies' names are given in the following figures. If you, yourself, do not know how much appliance business in dollars per meter per year you have put out, I think it will pay you to figure it out and make comparisons. When you suffer by the comparison, make up your mind that *now* is the time, the greatest opportunity of the gas industry, to put modern appliances in the households of people who have the money to pay; people who have the mind to buy—who will buy appliances if they appreciate their value even partly as well as you and I do.

"Gentlemen, we have come to the parting of the ways. We are at the cross-roads in the gas industry where we, of the sales department, will take the turn to the right. That road means intensive selling. Fill in the winter valleys by selling appliances to the customer. When you show conclusively by facts that the cost of gas as compared to coal warrants the using of gas appliances twelve months in the year, you will then help to fill in the winter valleys of your output. Why sell a gas range to a customer who will use it only five months out of the twelve when we need the seven months' use more than we do the five?

"Before making an analysis of the figures I have here from member companies, I would like to call to the attention of the appliance manufacturers the thought that the larger development of the gas industry will come from the smaller gas companies. Entirely on the efficient selling of these companies will depend, in the larger sense, the increase in your gas appliance sales. At the present time, we all know that the shortage of houses is particularly acute in the larger towns. Does it not, therefore, seem logical to assume that the smaller town, where the congestion is not so great, will have a higher percentage of increased population than the larger cities?

"This, to my mind, is also strengthened by the fact that rents, real estate, and living expenses are much lower in the smaller towns than in the larger. From the fact that the high cost of living is uppermost in people's minds, the lower cost in smaller towns will have this effect. This means an increase even to the towns which have not shown very much increase in the last five or ten years. There seems to be a great possibility of the tide, which in the past years has been from the smaller towns to the larger cities, flowing back again. Therefore, manufacturers, we of the smaller gas companies are asking for your increased co-operation to help us develop the small gas companies of New England, which, to my mind, means the gas industry of New England.

I have a list of twenty-three companies whose combined gas appliance sales for the last year, ending June 30, 1919, amount to a little over a million dollars, which, divided by the total number of meters, means that approximately $3.41 worth of gas appliances have been sold for each meter during the past year. For your information, the highest dollars of appliances per meter per year is $7.64. This runs down to $.84 per meter per year. The four last companies on my list, which show $1.39, $1.16, $1.11 and $.84 respectively per meter per year have had no salesmen and are practically the smallest companies on the list. These four companies for the last year have shown very little increase or none at all in their output of gas per meter, which proves conclusively that if your individual company is not around the top of the list in its showing of dollars' worth of appliances sold per meter per year, sooner or later your output of gas per year is going to suffer.

It has been my intention in getting these figures together to do the same thing next year, giving us all a chance to better our showing. I realize that the year ending June 30, 1919, has been the hardest year for merchandising in the gas industry, so we have lots of time to better these figures, if we only will.

The following is a list, with no names given, showing the dollars worth of appliances sold per meter per year:

1	$7.64
2	5.43
3	5.19
4	5.01
5	4.94
6	4.88
7	4.73
8	3.67
9	3.43
10	3.43
11	3.31
12	3.22
13	2.84
14	2.63
15	2.49
16	2.47
17	2.29
18	2.10
19	2.07
20	1.39
21	1.16
22	1.11
23	.84
Average	$3.41

The opening meeting of the 1919-20 season of the Gas Sales Association was held Friday evening, Oct. 10, at the Boston City Club. William Gould, who was unanimously elected governor for the third season, addressed the largest gathering in the history of the organization. The digest of his talk ran:

"I would like to again impress upon all present the fundamental objects for which the Gas Sales Association was founded: 'Co-operation between gas man and appliance manufacturer to increase the sales of appliances and thus increase the use and of gas.' To this end, enthusiastic boosting and constructive criticism should be employed in the proper spirit.

"We are just recovering from the terrible strain of the war period. To overcome the handicaps which we have suffered during the past year, we must work harder than ever before. To give us the extra strength needed, we see the light of promise ahead. Sometimes lots of optimism is necessary to tide us through periods when we cannot see far into the future, but the conditions are now such that all may plainly see a bigger, better business than they have ever experienced.

"There are several reasons that make me feel that the future holds no promise but a good one. One is the newly formed American Gas Association with which we have affili-

ated. Benefits which we shall receive from this new organization are tremendous and we must, in turn, give it our help in every way. Our secretary, J. B. Anderson, of Brockton, Mass., chairman of the Massachusetts State Commission of Membership, will speak to you about the work of the A. G. A."

Mr. Anderson made an appeal for individual members for the new association. Every gas company and every appliance manufacturer in New England should be represented by personal membership in the A. G. A. The dues are trifling and not to be measured against the benefits which the members will receive. One feature alone, the free bureau of industrial appliances, will be able to give members information which they themselves could not secure for thousands of dollars. The research work and statistical data of the gas industry the country over and, indeed, of foreign lands as well, will be gathered and tabulated for the use of the A. G. A. members.

William Gould then read his paper, as reprinted above. Following his paper, Mr. Gould called attention to the fact that there had not been made in the country any attempt to establish an arbitrary relation between appliance sales measured in dollars and increased gas consumption measured in feet per year. He asked if such a standard could not be established and if once established, it would not be of great value to appliance managers in going to their directors for increased advertising or other funds.

Considerable discussion ensued in which the possibility of arriving at a fair figure of this character and its then value as against other systems of computing the value of increased consumption due to appliance sales followed. Mr. Gould asked the matter to be given serious thought so that at a later date, it might be possible to establish some definite statistics.

It was conceded by all that a certain amount of appliance sales must be made each year merely to hold the yearly output constant. Another point to be determined was the volume of appliance sales required to maintain an output constant, and the rapidity with which output would increase when appliance sales exceeded the minimum to be determined as above.

Following this discussion, Eugene Slutzkin, vice-president of the Shoe Manufacturers' Association of Russia, told in most interesting form a few of his varied experiences since the revolution in Russia. Mr. Slutzkin, who has been in this country only a few weeks, expresses himself extremely well. Part of his story, which is given below, will show how fortunate we are to be in a better social condition than exists on the other side.

"I ask your indulgence if all my words are not clear to you. When I say it is a matter of only six short weeks since I had the pleasure of arriving at your shores, I know you will bear with me. I am going to tell you of my personal impression and sufferings in Moscow a little more than a year ago, and I will conclude by giving the views of authoritative men who came from there later on.

"We will start with how the Bolshevik came to be in control of the Government. Due to a fatigue from the war and the helplessness of Kerensky, who at that time was the head of the Government, the Bolshevik offered what was most desired by the people—an early conclusion of hostilities and peace. In addition they offered a distribution of the wealth, and a division of the land in Russia among the peasantry.

"Non-educated Russians receiving their freedom, felt at liberty to plunder, and from that moment chaos reigned. They entered houses, stealing what was to be found, and made life for the wealthy man unbearable. The army and police organizations were destroyed, and then murder began. The bourgeois, in self-defense, began to procure arms, but a decree was issued that all ammunitions should be surrendered in three days, and anyone found with some in his possession after that would be subject to death. After the three days' notice, search of the houses commenced, and the Bolsheviks took advantage of this opportunity to rob and pillage.

"A large per cent of the Bolsheviks were comprised of ex-convicts, boys of 14 and 15 years of age, and men who liked to fish in muddy waters. It was no uncommon occurrence during the day on the car or in the street to have an order given to stop. You would then be surrounded and compelled to hold up your hands, and while they were searching, supposedly for ammunition, they would relieve you of your money, jewelry, and so forth, and if they felt so inclined would kill you. The people of the better class refused to deal with these people and preferred suffering or even death.

"The next decree issued was the nationalization of the banks, followed by a nationalization of the factories, church, and then an attempt at socialization of womanhood. They entered our houses, robbed us of all our property, and threw us out of our houses. Class distinction was eliminated; poor families living in cellars were placed in with the families of the rich. They separated classes; Bolsheviks belonged to the first class; factory workmen to the second; Government employees in the third, and bourgeois, or wealthy class, to the fourth.

Bread cards were issued, the first class receiving one-half pound of bread; second, three-eight pound, and the wealthy class, one-eighth pound, which they rarely received, and when they did it was so badly mixed with sand and straw it was impossible to eat it. A person with clean linen and white collar was accused of belonging to the bourgeois, and often in the train or tram cars he was thrown on the street.

"Next an organization was formed to suppress anti-Bolsheviks and war profiteers. At the head of this committee was Petus Jedjinsky. They persecuted thousands and thousands of men, many of whom were professors and of the more intelligent people. The terror seemed to reach its zenith in August when the commissaire of education was assassinated in Petrograd, where they killed people in masses, and persecutions surpassed the inquisition in Spain.

"They arrested a person, and then came to the house asking the family if they would pay a certain amount of money, so the person would be released; if not, he would be killed. I will tell you about my uncle who was a very prominent man in the town of Bitebsk. They arrested him and demanded from his wife one half million rubles for his release which she hesitated to give. When she brought food the officer at the prison door said it was not necessary as he was to be killed within a few hours and would be obliged to dig his own grave. At the last moment they accepted the money and he was released.

"Every day they issued a new decree and forced large payments. The demands for money were so great that people could not pay them, and this offered a reason for arrest. To be the father or even the grandfather

of a Russian officer was sufficient reason to be killed. In the house where I lived, there was an old gendarme and his father-in-law, 80 years of age, both a long time out of service, whom I knew to be good and honest men. They were both killed the same night, and there are thousands of other similar examples.

"The people were obliged to buy from the peasants direct at exorbitant prices. For a pound of bread 20 rubles or more; butter, 40 rubles, and sugar, 25 rubles. We had no coal for the house for a very long time and we had to pay very high prices for wood. We were glad when we had 15 to 16 degrees Fahrenheit. Little children could not obtain milk, and the mothers could give them nothing to eat, so about 95 per cent of the new-born children died.

"The streets, not illuminated, gave opportunity for crime. To take a horse car and ride from, say Tremont Street to South Station, you would have to pay 60 rubles, but you would walk faster for the horses were without food, and could barely walk. They were to be found lying dead in the streets, and the general view was awful. Everybody endeavored to go to the southern part of Russia which was occupied at this time by the Germans, but they were not allowed to take anything with them. On the frontier they would take everything from you and possibly kill you. You cannot picture the frightful conditions of travel in the Russian trains. They were so crowded that it was impossible to enter or leave. The president of all Russian Shoe Manufacturers' Association, of which I am the vice-president, was a victim of this. Under these circumstances the people preferred to leave all and save their lives. I left my shoe factories, my residence, my large leather business, and everything, but I do not regret it.

"Now, about the situation of the workingman. Since the first revolution in February, 1917, every factory sent one or more representatives to the Government, and in this way the Government was formed. In each factory they had a committee consisting only of workmen. In choosing the committee, they gave preference to the worst element. If a man did not agree with the ideas of the Bolshevik, he could not be elected to this committee. The foremen, and men who were specialists on responsible machines, could not work with these men and left the factories. Then they had great difficulty replacing competent men on the machines, and so in a short time the production had fallen away to almost nothing. When they had to discuss a matter of no importance, they called all the workmen out of the factory and this happened no less than twice a day.

"The high cost of living obliged the workmen to ask for a great deal of money, and these requests were so frequent it was impossible to comply. Where we had first paid from 2 to 3 rubles a day for labor, we finally paid 40 and 50. A pair of shoes which cost 75 kopecks before the war, cost 120 rubles. Most of the factories closed down and the few that remained made only ammunition, clothing and shoes for the soldiers.

"This caused widespread unemployment, and those who were not in the army were without food and shelter, and the suffering was great, resulting in a dissension, and confidence in the Bolshevik movement was waning. Strikes and revolts were common. The peasants were obliged to surrender their bread to the army for money which was of no value. Revolts grew to great proportions. The people, having continued war instead of the promised peace; starvation instead of the promised bread, looked for another leader to deliver them. Kolchak, who is meeting with good success in Siberia, has advanced from the east. Denikine is meeting with good success in the south; the Poles are advancing from the southwest, while the northern army has made great strides from their base at Archangel—General Judeming is about to take Petrograd. All towns when taken from the Bolsheviks meet their deliverers with enthusiastic acclaim and reinforcements. With no interference from the Ukrainian and Polish armies, it is my belief that Russia will be liberated from Bolshevik control very shortly.

"It is my hope and belief that the new Russia will be a government of the people and for the people, and that the cruelties and injustices of the old form of government will disappear. When these conditions prevail it will be but a short while when Russia will again take her place among the leading nations, as she possesses untold natural resources. Temporary aid from the great powers will enable her to take her first steps towards prosperity and happiness.

"I will conclude by explaining an expression used by the Russian peasant. After he has tilled the soil he stands with bared head and prays: 'Mother Russia, help me.' Let me apply this to your America in our desire for aid, which I assure you will bear a grateful fruit."

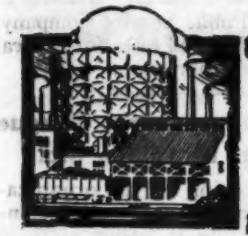
Louisville Gas Starts Customer-Ownership Plan

The customer-ownership plan of distributing electric and gas securities among the citizens served by Byllesby companies has been extended to the Louisville Gas & Electric Company of Kentucky. Within a few days after the announcement of the plan in the newspapers 520 inquiries had been received and nearly 100 residents had become preferred shareholders. The company has opened a new investment department in charge of J. W. Smiley, formerly with the securities department of the Northern States Power Company.

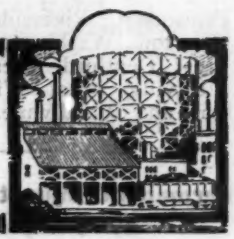
The Louisville, Ky., *Evening Post* said in announcing the new plan: "Electric and gas users and the public generally will be invited to become profit-sharing partners in the Louisville Gas & Electric Company, in accordance with a new financing policy announced by the company. To make this possible preferred stock will be issued and offered with a view of giving people of small as well as large means an opportunity to acquire part ownership. Investment on the partial payment plan will be a feature, and the company will henceforth maintain an investment department at its office, where citizens may purchase its securities direct.

"The Louisville Gas & Electric Company of Kentucky has no preferred stock outstanding at present. Recent amended articles of incorporation were filled, authorizing the issue of 7 per cent preferred stock, and the board of directors has authorized the sale of $2,000,000 of such stock to the public. Proceeds of the stock must be used for the retirement of outstanding bonds or the construction of additions and extensions to the property which would otherwise require the issue of bonds. The new stock will have full voting rights.

"In the past the funds required for construction purposes to serve the increasing demands of a growing city and business has been obtained by the company through the usual investment channels. The new plan marks the inauguration of a definite step toward the building up of a large number of customer-shareholders among citizens in all walks of life."



NEWS OF THE GAS INDUSTRY



Record Crime Wave Grows as Chicago Dims Lights

With street lights dimmed in an effort to conserve fuel, reports of the Chicago police for one day included thirty-six hold-ups, twenty-eight auto thefts and safe-blowings, eight underworld leaders arrested and the Mayor's car stolen. During this period of dimly lighted streets the police report the greatest crime wave Chicago has ever experienced.

Drastic Orders for Curtailment of Coal in Indiana

Drastic orders for the curtailment of the use of coal by all public utilities in Indiana have been issued by the public service commission. The order became effective at midnight on Nov. 15.

The order provides the following:

1. Electric current and gas used in sign and display window lighting shall be discontinued.

2. Electric current used for street lighting shall be discontinued except on moonless and cloudy nights.

3. Traction companies shall curtail their service to a point where only the necessities of the community served are taken care of.

4. Heating companies shall furnish such quantities of water and at such temperature that the heretofore adopted standards for heating buildings shall be lowered 5 degrees.

5. Water supplied fountains and other displays shall be discontinued.

6. Water pressure, except in case of fire, shall be lowered to such pressure that only the necessities of the community are served.

7. Gas companies shall limit the use of gas to cooking, lighting, domestic water heating and industrial uses.

The order was issued on recommendation of the Indiana Utilities Fuel Committee, which held a special meeting at the state house in Indianapolis. The Indiana Utilities Commission went into session immediately and passed the order carrying out all the recommendations of the committee.

The order provides that any public utility or municipality in the State of Indiana, as such, may appeal to the commission against the application of the order of curtailment, the appeal to rest on a showing that the public health or safety is adversely affected to such an extent that its consideration should outweigh the consideration of the conservation of coal.

Philadelphia Company Will Manufacture Gas—Plans for 30,000,000 Cu. Ft. Daily Production

At a conference held recently under the auspices of the Public Service Commission in Pittsburgh, Pa., the prediction was made that in the near future manufactured gas for heating purposes will be substituted largely for natural gas in the Pittsburgh and other districts, where a considerable shortage in supply of natural gas has developed. The Philadelphia Company, which has been a large supplier of natural gas for many years, it is stated, is now prepared to supply 7,000,000 cu. ft. of gas per day, and expects in the near future to be able to supply 30,000,000 cu. ft. of manufactured gas per day.

Second Largest Gas Well in Williams Field Brought in

The G. T. Cazort gas well in the Williams field of Arkansas was shot in and on its final test made 19,500,000 cu. ft. of gas. It required five days to shut in the well, which is the second largest in the Williams field. The Cazort well is an offset to the 24,000,000-foot gasser of the Clear Creek Oil & Gas Company on the Bushmaer farm, it being the largest in the field.

Eighteen-Cent Increase Effective Dec. 1 in New Jersey

The price of gas in several hundred New Jersey municipalities supplied by the Public Service Gas Company will be increased on Dec. 1 from the present rate of 97 cents to $1.15 per 1,000 cu. ft.

This increase was authorized by the board of public utility commissioners in disposing of an application filed by the Public Service Company last June asking for permission to increase its rate to meet the added expenses of operation.

The board's decision in the gas case will again bring to an acute stage the question of rate regulation. After years of effort the cities of New Jersey succeeded in establishing a base rate of 90 cents for gas, which was finally upheld on appeal to the Court of Errors. Last year, due to war conditions, the commission empowered the gas company to add a surcharge of 7 cents to the base rate of 90 cents, making the actual cost to the consumer 97 cents.

The board's decision was based upon conclusions that the present rates for gas are insufficient and that the increased schedule proposed by the company in June and suspended by the board pending investigation is just and reasonable. Commissioner George F. Wright, of Paterson, dissented from the majority opinion.

About twoscore of cities and towns in Camden and Gloucester counties are affected by the decision. These include Camden, Audubon, Barrington, Beverly City, Beverly Township, Bordentown City, Bordentown Township, Burlington City, Burlington Township, Center, Moorestown, Cinnaminson, Collingswood, Delano, Deptford, Ewing, Fieldsboro, Florence, Gloucester City, Haddon Township, Haddonfield, Haddon Heights, Hamilton, Laurel Springs, Mansfield, Merchantville, Mount Holly, Oaklyn, Palmyra,

Pensauken, Riverside Township, Riverton, Washington Township, West Deptford, West Hampton, Westville, West Winds, Woodbury and Woodlynne.

Permanent Injunction Sought by Companies

Arguments for a permanent injunction against the city asked by the Los Angeles Gas & Electric Company and the Southern California Gas Company to prevent enforcement of the ordinance requiring the companies to serve natural gas in place of manufactured gas were heard by United States District Judge Bledsoe.

The companies more than a year ago obtained a temporary injunction restraining the city from enforcing the ordinance. The natural gas ordinance is known as No. 37511, new series. It has been under fire of both gas companies since the voters ordered the adoption of the ordinance in November, 1918.

The companies' attorneys, in their arguments to secure a permanent injunction against the city and it officials, advance the claim that the ordinance is confiscatory in character. The companies maintain that they have neither the equipment nor facilities for serving the natural product.

The suits were filed by the companies in the United States district court on Dec. 2, 1918. Shortly thereafter Judge Bledsoe granted a temporary restraining order, preventing city officials from enforcing the ordinance. The companies now seek to make the injunction permanent.

Southern Counties Company Puts New Rate into Effect

A new rate schedule to be put into effect by the Southern Counties Gas Company of California for natural gas sold in Ventura County will increase the bills of approximately 26 per cent and reduce the bills of approximately 74 per cent of the consumers, according to an announcement by the State Railroad Commission recently in approving the new schedule.

An increase of the minimum charge from 50 cents to $1 is the principal change

Low Pressure of Natural Gas Affects City Water Works

At a special meeting of the Board of Public Works held in Corning, N. Y., the matter of the deficiency of the natural gas supply in the city so far as it affects the Corning Water Works pump station was considered, but the meeting adjourned without action being taken.

For the past two weeks the water department has been experiencing much difficulty in operating the pumps at times because of the insufficiency of the gas supply. At other times it has been necessary for the pumps to be kept in operation when otherwise they would have been shut down because of the fact that if the operation of the pumps ceases for a time the pressure of the gas might fall so low that it would not be sufficient to get them into operation once more as a heavier pressure is required at the start.

This situation is both costly and annoying to the city. If at any time the gas supply should fall altogether for a considerable period the city should be in a serious condition as even if both reservoirs are in order and functioning properly which is not now the case, the reserve supply of water is not sufficient to continue supplying the city over a very considerable period as the city's consumption has greatly increased during the past few months.

Illinois Commission Rehearing Several Rate Cases

The Illinois Public Utilities Commission has under consideration several cases having an important bearing on gas rates at various points in Illinois.

The commission has granted the request of the Alton Gas & Electric Company for a rehearing of their petition for advances in rates for general gas service in the city of Alton, Ill. The company has prepared statistics of receipts, operating expenses, quality of gas, efficiency of operation and on other points, which will be submitted to the commission.

The commission has before it the case of the village of Central City against the Centralia Gas & Electric Company. The suit is in the nature of a test case, the village seeking an order from the commission directing the defendant company to restore street lighting service in Central City.

The commission will also hear arguments on the petition of the Central Illinois Public Service Company, asking for advanced rates for general gas service at Charleston.

Gas Consumers League Formed in Joplin, Mo.

The formation of an organization to be known as the Gas Consumers' League is being planned by Joplin, Mo., gas users. Many users of gas in Joplin say they cannot understand why surrounding near-by towns secure gas at one-half and one-third less than Joplin does, and it is urged by those who are planning the organization that with the concerted effort of the gas company and the consumers the gas problem can be thoroughly investigated with some chance to secure a reduction of the price to consumers in Joplin. Manufacturers in Joplin claim that the difference in price of gas puts them at a decided disadvantage with other manufacturers in the vicinity.

The Public Service Commission of Missouri is being severely censured by Joplin manufacturers and gas users for allowing gas to be sold for 25 cents per 1,000 cu. ft. in Carthage, Mo., near Joplin, and permitting it to be sold for 70 cents in Joplin. The manufacturers do not complain so much about the cost of gas in Joplin as they do about the fact that the manufacturers in other cities are given the advantage of cheaper gas, it was stated by the men behind the Gas Consumers' League.

California Railroad Commission Probing Gas Supply

Investigation by the State Railroad Commission of the natural gas resources in southern California and manufactured gas supplies in Kern, Los Angeles, Orange, San Bernardino and Riverside "to bring about conservation and insure an adequate supply," was announced by the commission.

Representatives of the Midway Southern California and Southern Counties Gas Companies and the Los Angeles Gas & Electric Corporation were directed to appear before E. O. Edgerton, president of the commission, in Los Angeles on Wednesday, Dec. 3, to lay before him the evidence desired.

The commission was conducting the investigation on its own motion, it was announced.

Texas Gas Association Changes Its Name at Its Fourth Annual Convention

Round Table Talks Featured at Meeting Proved of Great Interest and Aroused Enthusiasm and Individual Discussion of Various Problems

At the fourth annual convention of the Texas Gas Association held in Houston, Oct. 14 and 15, it was unanimously decided to change the name to South Central Gas Association, as this name more correctly indicated the field of operation of this association, as its membership is composed of men from the States of Oklahoma, Texas, Louisiana, Arkansas and New Mexico, and it was conceded by the members outside of Texas that more members could be secured from adjoining States if they were given to understand that the association was not intended for Texas gas men only, as the old name would indicate.

The secretary's report showed a membership of seventy, with thirty-two members in attendance at this meeting. The executive committee felt that this was quite an encouraging report when it was recalled that this association was organized in 1916 with twelve men in attendance, and the next convention, to be held at a time and place to be selected by the executive committee, should show a membership of at least 100, as every member pledged himself to assist in building this organization to a point where it will be the envy of other associations of this character. Since the 1918 convention fifteen new members have been added.

Every session of the meeting was fully attended and the greatest interest was evidenced in all papers and talks, by the lively discussions that followed. The "Round Table Talks," a feature inaugurated at the 1918 convention, proved so interesting that it was impossible to adjourn at the time set for the close of each session, but notwithstanding this fact, every session began on time with full attendance.

Following a thorough discussion at one of these "Round Table Talks," the Texas Gas Association went on record an unanimously favoring the 100 cu. ft. unit for basing gas rates.

It was also unanimously voted to affiliate with the American Gas Association and the Natural Gas Association of America, the latter being represented by O. K. Shannon, of Fort Worth, who personally extended the invitation of the N. G. A. of A. to affiliate with them. W. H. Sedberry, immediate past president, was elected delegate to both the above associations.

W. H. Sedberry, as president, addressed the meeting.

Dana G. Griffin read a paper on "Gas Engines."

P. E. Nicholls, of the Galveston Gas Company, read a paper on "Investment Conditions."

A paper by F. C. Armbruster, of the Port Arthur (Texas) Gas & Power Company, on "Boiler Fuel Economy," was an extremely interesting one. It was accompanied with a number of charts. We hope to publish this paper with the charts in our columns later.

The other subjects prepared were: "Gas Company Accounting," by H. P. Carroll, of the Beaumont Gas Light Company; "Efficient Gas Combustion," by W. D. Carpenter, of the Duquesne Burner Service Company; and "Advantages of Public Utility Commissions," by F. J. Storm, of the Amarillo Gas Company. All of these developed into extemporaneous talks.

At the "Round Table Talks" the subjects thoroughly discussed were: "Petroleum Coke for Generator Fuel," "Relations with Architects and the Building Trades," "Teaching the Consumer to Read His Meter," "The Commercial Department," "Gratuitous Work," "Dead Services."

Then there were the reports of the various temporary committees, followed by the election of officers.

At the call of the president for a report of the nominating committee, Fred C. Armbruster secured the privilege of the floor, and requested that all rules and precedents be suspended, while he begged the present secretary-treasurer who had previously declined to accept re-election, to reconsider his decision and accept the nomination, on the ground that no other member was so well qualified; and due to the fact that the association was enlarging its scope, it would necessitate the efforts of one who was familiar with its operation to successfully carry the work through the coming year.

He then asked the privilege and pleasure of personally nominating C. H. Seidenglanz for the office of secretary-treasurer and with steamroller tactics the convention unanimously re-elected him. The nominating committee's slate which follows, was unanimously elected:

President, P. E. Nicholls, Galveston.

First Vice-President, C. B. McKinney, Dallas.

Second Vice-President, F. L. Weisser, San Antonio.

Secretary-Treasurer, C. H. Seidenglanz, Dallas.

Directors for two years, William Bailey, Schreveport; C. L. Burger, Tyler.

Director for one year, F. C. Armbruster, Port Arthur.

The convention sprung a surprise on the secretary-treasurer, when President Sedberry, in a snappy little speech, presented the secretary-treasurer, on behalf of the association, with a handsome Gladstone traveling bag. The secretary-treasurer, in expressing his thanks for this manifestation of friendship and appreciation on the part of the members, promised, if given the support of the membership, the South Central Gas Association would in the coming year make a record of which every member would be proud.

Retiring President W. H. Sedberry then yielded the chair to the incoming president, and following Mr. Nicholls's speech of acceptance the meeting was adjourned and every man in attendance voiced the sentiment that it was the best gas convention he had ever attended.

The entertainment planned for the members attending was a theater party, to which the association members went in a body on the opening evening of the convention.

It was planned that one of the afternoon sessions should be held aboard the Steamer Nicholaus, sailing down Houston Ship Channel to Morgan's Point on Galveston Bay. A sumptuous fish dinner was also planned on board the steamer, but this trip had to be abandoned on account of excessive rains making such an outing impracticable. Consequently, all sessions were held at the Bender Hotel.

The time and place of the next meeting was left to the executive committee pending developments in the securing of additional members

from adjoining States, and it is the intention of this committee to solicit an expression from all members, at a later date, as to the best time and place to hold the next convention.

The secretary-treasurer, C. H. Seidenglanz, reports that plans for the next convention are well under way, and there are already six papers promised for it, which practically assures another successful meeting. The South Central Gas Association now has seventy-one members distributed in the States of Texas, New Mexico, Louisiana, Oklahoma and Arkansas.

City, State and Company Trying to Co-operate in Chicago Rate Case

It has been decided that through co-operation of the city of Chicago, the State of Illinois and the Peoples Gas Light & Coke Company, all three sides co-operating in reaching an agreement on gas rates in Chicago that thousands of dollars will be saved by each.

It was nearly two months ago that the case of the Peoples Company came before the Illinois Public Utilities Commission. The company wishes to have rates based on the value of money invested so the investor will have a fair return. The hearing is on the valuation of company property and it was anticipated that months would be consumed—months that would cost the company, the city and the State dearly—before the commission could even get the evidence before it.

The suggestion of conferences of opposing sides, with the commission represented by engineers and the Assistant Attorney General of Illinois, was adopted and after a few weeks, counsel for the company and for the city reported to the commission that the informal conferences had made such marked progress that nearly every matter included in fifty-seven volumes of inventories which had been prepared for the company last year has been virtually agreed upon.

A further recess was then requested in the hope that the two sides might get together on a stipulation for prices.

The conferences continued with the understanding that on November 18 a report would be made to the commission on the progress that had been made and the methods followed.

When this hearing was opened, Donald R. Richberg, counsel for the city, submitted this report, which had been agreed upon, and a further recess until December 2 was granted:

"After several conferences between the engineers and attorneys representing the gas company, the city and the commission, a program has been outlined for conferences to attempt the pricing of the company's inventory (as accepted by the city) upon theories adopted by the company and the city. While these theories might be described as reproduction cost, new and original cost (actual and estimated) it has been found there will be some difficulty in defining the theories satisfactorily at the outset and it has been decided to postpone for the time being such definition.

"In succeeding conferences the engineers will endeavor to agree upon prices to be applied to the inventory in accordance with the theories utilized by the company, and by the city, in appraising the value of this property. Each party reserves the right to question the correctness of the principle of the pricing theory used by the other party, and while it will be the effort of the conference to agree both upon joint definitions of the respective theories and upon the inventory pricing thereunder, in the absence of such agreement each party reserves the right to question the definition and method of applying prices under the other party's theory.

"The following procedure has been tentatively adopted for future conferences.

"1. Inventory as of Jan. 1, 1917, will be priced to that date.

"2. When the inventory as of Jan. 1, 1917, is corrected to be an inventory as of July 1, 1919, corrective factors will be applied to bring pricing to the latter date.

"3. As the conferences proceed a reasonable detail of the basic data utilized in obtaining unit costs and otherwise used as the basis for price fixing, will be set up by the conferees in the form of exhibits to be subsequently introduced before the commission, in order that there will be presented to the commission not merely the conclusions of the conferees as to correct prices, but a summary of the supporting data through which such prices were obtained, in order that the commission may have full opportunity to accept, reject or modify the conclusions of the conferees in the light of the evidence upon which such conclusions are based.

"4. Minutes of the conferences will be kept in such a manner that at the conclusion of the conferences a report may be made to the commission showing the methods and data utilized by the conferees, giving the commission information comparable to a careful abstract of the record of a valuation hearing.

"5. The conferees will avoid any action which might be regarded as assuming any of the discretionary functions which must be exercised by the commission and also any action which will limit in any way the attorneys from controverting the theories or methods of application of theories and data. It will be the purpose of the conferences to eliminate so far as possible the necessity for cross examination as to *facts*.

"It is agreed that the only adequate test of the efficiency of the proposed conferences is to go forward with the actual work of the pricing the inventory, it being agreed that unless a final report can be made, approved by both the company and the city, neither party will be bound by agreements made tentatively during the progress of the conference."

Rock Island Company Granted Extension of $1

An extension of two weeks in the dollar gas rate in Rock Island was granted by the Illinois Public Utilities Commission, R. B. MacDonald, general manager of the People's Light & Power Company, announced.

Mr. MacDonald said that a permanent order will be made by the commission after it has had an opportunity to check over the data furnished by the company.

In its report before the State Commission which met in Chicago, the company furnished an exhibit of its operating expenses and earnings for the eighteen months the dollar rate has been in effect to prove that not more than 5.34 per cent profit was made by the company during that period.

Had the two weeks' extension not been granted the rate would have reverted to 85 cents. The Illinois State Commission in May, 1918, granted the dollar rate as effective for one year. Last spring it granted an extension of six months.

The People's Light & Power Company maintains that the cost of manufacturing and distributing gas is practically unchanged and that the higher rate is absolutely necessary.

Blackstone Gas Issues New Stock

The Blackstone Valley Gas & Electric Company, of Woonsocket, R. I., announces a new issue of its 8 per cent stock, to the amount of $288,750, to which common stockholders of record Nov. 10 may subscribe at par, $50, in the ratio of one new for two old. Rights to subscribe will expire Dec. 6 and these rights are quoted at $1 each.

The company was incorporated in 1912, and acquired the physical property of Woonsocket Gas Company, and, subject to the outstanding bonds, the physical properties of Pawtucket Electric Company and Woonsocket Electric Power & Machine Company. It also acquired the common stock of the Pawtucket Gas Company of New Jersey, which owns all the capital stock of the Pawtucket Gas Company, and other property and assets of the Blackstone Valley Gas & Electric Company of Maine. Stock of the present company was exchanged for stock of the old company, share for share. The principal franchises are not limited in time. The estimated population served by the company with gas is 157,800.

Appliance Employees of Boston Company Held Dinner and Entertainment

The employees of the appliance department of the Boston Consolidated Gas Company spent a very enjoyable evening in the recreation hall of the appliance building last week. The affair was given under the auspices of the Gas Appliance Social and Benevolent Association, and it was largely attended by the heads of the various departments of the company and by members and friends.

Dinner was served, followed by brief speeches by officers of the association and department heads. The dinner was served in the new gas kitchen on the premises under the direction of B. H. Harrison, a member of the association, who acted as special caterer, assisted by the following members of the entertainment committee: John Lee, chairman; Chief Edwards, formerly of the United States Navy, and J. L. Clark.

N. A. Clark was the master of ceremonies.

Biggest October in History of Spokane Gas Business

Increased Industrial Activity, Not Coal Shortage, Given as Cause

Gas consumption for the month of October was the greatest in the history of Spokane, Wash., according to figures filed with the department of public utilities by the Spokane Falls Gas & Light Company.

The month of September was next and the month of October, 1917, was the highest previous to this fall.

The figures show that consumption reached 23,117,000 cu. ft. during October, a figure 2,239,000 cu. ft. in excess of the consumption of October, 1917. September consumption was slightly in excess of that of October, 1917.

"Increased industrial activity is the cause," said Harry Warner, general manager of the gas company. "The coal shortage has nothing to do with the increase in consumption, and while we have not yet completed the summary of the monthly business, and are unable to speak definitely, it is not our belief that the increase in the number of home users has a material effect on the increase. The capacity coal gas output of the company is being used."

Following are the October figures for the past five years and the yearly averages for that period:

1915	17,728,000
1916	19,463,000
1917	20,938,000
1918	20,347,000
1919	23,177,000

Yearly averages:

1916	18,000,000
1917	19,410,000
1918	9,510,000
1919	21,500,000

The 1919 average is an approximate by H. C. Bender, superintendent of public utilities.

$2 Gas Approved in New Jersey

An increase in the charge to the consumer for gas from $1.83 per 1,000 cu. ft. by the Tuckerton (N. J.) Gas Company, to $2 was approved by the New Jersey Public Utility Commissioners. The company asked for the increase declaring it had been notified that the purchase price of gas from the Ocean County Gas Company to the Tuckerton concern would be increased 17 cents a 1,000 cu. ft.

U. S. District Court Rules in Favor of Company

There will be no further effort of the city of Fort Smith, Ark., to contest the right of the Fort Smith Light & Traction Company to charge 25 cents per 1,000 ft. of gas. The city commissioners will not appeal from the decision of Judge Frank Youmans, of the United States District Court, who some time ago held the city's 17-cent ordinance was illegal. The ordinance was passed last January, after the company increased the price of gas from 15 to 25 cents.

The company obtained a temporary restraining order against the ordinance, and Master H. E. Mechem, who heard the evidence, decided in favor of the city.

Byllesby Companies Ambrine First Aid Equipment

All properties owned and operated by the H. M. Byllesby Company, have been equipped with ambrine, a wonderful healing medication for burns brought into prominence during the war. Due to the enormous demand on the fighting fronts for ambrine it has only been available for industrial and peaceful pursuits for a short time—and the Byllesby properties are among the first to secure it. Stories of ambrine's healing powers are marvelous—the first application by a Byllesby property is a sample. A workman for the Stockton Division of the Western States Gas & Electric Company was severely burned on the hand with hot pitch. The burn was two inches wide, five inches long and quite deep in one place. After opening the blisters and applying the ambrine the patient suffered no further pain. A new application and dressing was put on every day for ten days, at the end of which time the hand was entirely healed.

Ambrine was discovered by a French physician in 1902, but it was not until the Germans launched their liquid fire attacks that its therapeutic powers were really appreciated. It has now become universally recognized by the medical profession as the first standardized treatment for burns of all degrees.

One of the important features of the ambrine treatment is that it cures without leaving scars. A patient who had received severe second and third degree burns covering his whole face as a result of an explosion, was completely healed without the trace of a scar in nine days.

San Antonio Company Reduces Rates to Pre-War Figures

A reduction in gas lighting rates, effective on all bills mailed after Nov. 1, was announced by the San Antonio (Tex.) Public Service Corporation. The reduction amounts to 10 cents per 1,000 cu. ft. on the gas rate, placing the present rate on a pre-war basis.

Rates were lowered after an application to the company had been made by Mayor Bell, in conformity with an agreement reached in November, 1918, when the company was permitted to increase its charges. The agreement was that a reduction should be made when the price of fuel became lower. Mayor Bell directed a letter to the company calling attention to recent decreases in the price of fuel oil. This letter was answered by the company announcing the following rates:

For first 10,000 cu. ft., $1.25 per thousand; next 20,000 cu. ft., $1.15; next 20,000 cu. ft., $1.05; all over 50,000 cu. ft., 95 cents.

The rates are subject to a 10 per cent discount if paid before a designated discount day.

The rate for gas since November, 1918, has been $1.35 per thousand for the first 10,000 cu. ft., $1.25 for the next 20,000, $1.15 for the next 20,000 and $1.05 for all over 50,000 cu. ft.; therefore the new rates put a general 10-cent reduction into effect.

In announcing the new rate E. H. Kifer, general manager of the company, said:

"In 1918, when the company petitioned the city authorities to allow an increase in gas and electric rates, we stated that we would make reductions when fuel prices would change sufficiently to permit us to do so.

"The city has requested us to make rate reductions, and as we are entering into new fuel contracts at lower prices than were paid during the past year we are accordingly reducing the maximum gas rates 10 cents per thousand and the maximum rates for electric lighting 1 cent per kilowatt-hour.

"This reduction becomes effective on all bills rendered after November 1.

"All persons using gas and electric lights in the city will be benefited by the reduction."

Will Double Number of Gas Lights and Triple Volume of Light

The Public Utilities Department of St. Louis, Ill., has announced that the number of gas lights on one of the avenues in the city will be doubled soon. The volume of light will be tripled, the style of the lamps being changed and double mantles being used. Work on widening the street and installing the new lighting fixtures will start soon in accordance with previous plans.

$1 Rate Decided Upon for Northeastern Ohio Company

Representatives of Ashtabula, Conneaut, Geneva and Jefferson, Ohio, met in Salem, Ohio, with M. B. Daly, president of the Northeastern Ohio Gas Company, to discuss gas conservation measures. They decided to recommend that rates be raised to $1 per 1,000 cu. ft., nearly three times the present rate.

City solicitors for the four municipalities then met to draw up uniform ordinances.

The increase is proposed to discourage gas patrons from burning gas in their furnaces. Gas used in the four places is obtained from the Saybrook field in Ashtabula County. Gas men say that unless steps are taken to conserve the supply the field will be exhausted by February, 1920.

Personal Notes

Horace H. Clark Resigns as Secretary-Treasurer of Illinois Association

Horace H. Clark has resigned as secretary-treasurer of the Illinois Gas Association effective March 18, 1920. R. V. Prather has been appointed in his place and will work with Mr. Clark until the close of the coming convention in March, 1920, at which time Mr. Prather will take the office.

Mr. Clark has served as secretary-treasurer for the past eight years, but finds his time too much taken by other duties to serve longer. Mr. Clark is industrial gas engineer of the Public Service Company of northern Illinois, located at Chicago, and has recently been appointed chairman of the Industrial Fuel Committee of the American Gas Association. He is also chairman of the Gas Engineering Section of the Western Society of Engineers; chairman, Chicago Chapter, American Steel Treaters' Society; Vice-president of the Fuel Auxiliary of the Illinois Manufacturers' Association, and has been appointed chairman of the Exhibit Committee for the Illinois Gas Association's Exhibit to be held in Chicago, March 16 to 18, 1920.

Mr. Prather is now secretary of the Illinois State Electric Association and the Illinois Electric Railways Association, and was formerly secretary of the State Public Utilities Commission of Illinois, and has been associated with utility companies for many years. His office is now in Springfield, Ill., in the DeWitt-Smith building, and henceforth the association will maintain two offices, one in Chicago and one in Springfield.

A. D. KERR, who for many years has been the manager of the Southern Illinois Gas, Light & Power Company, has severed his connection with the company and will leave for Oklahoma in the very near future.

RICHARD L. LECHNER, general manager of the Illuminating Supply Company of Belleville, Ill., and SAMUEL HOLT, an employee of the company, were injured Nov. 20, when an acetylene lighting machine, weighing 800 pounds, fell on them. They were installing the plant on a farm near Alton, Ill. Holt was taken to an Alton hospital, while Mr. Lechner came to Belleville to be treated at St. Elizabeth's Hospital. An x-ray picture showed that he had a broken shoulder, two broken ribs and several bruises about the chest. He had traveled 35 miles before being given medical attention.

C. W. BECK, manager of the Albion Gas Light Company, has been promoted to engineer of the Jackson Light & Traction Company at Jackson, Miss.

L. O. GORDEN, of Grand Rapids, is appointed temporary general manager of the Albion Gas Light Company, succeeding C. W. Beck, who goes to Jackson, Miss.